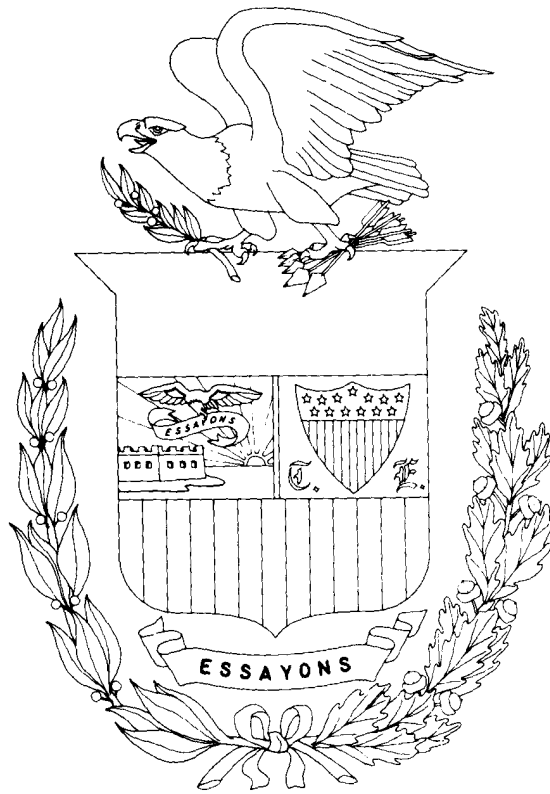


WATER RESOURCES DEVELOPMENT BY THE U. S. ARMY CORPS OF ENGINEERS IN MISSISSIPPI



**U. S. ARMY CORPS OF ENGINEERS,
VICKSBURG DISTRICT, VICKSBURG, MISSISSIPPI
April 2001**

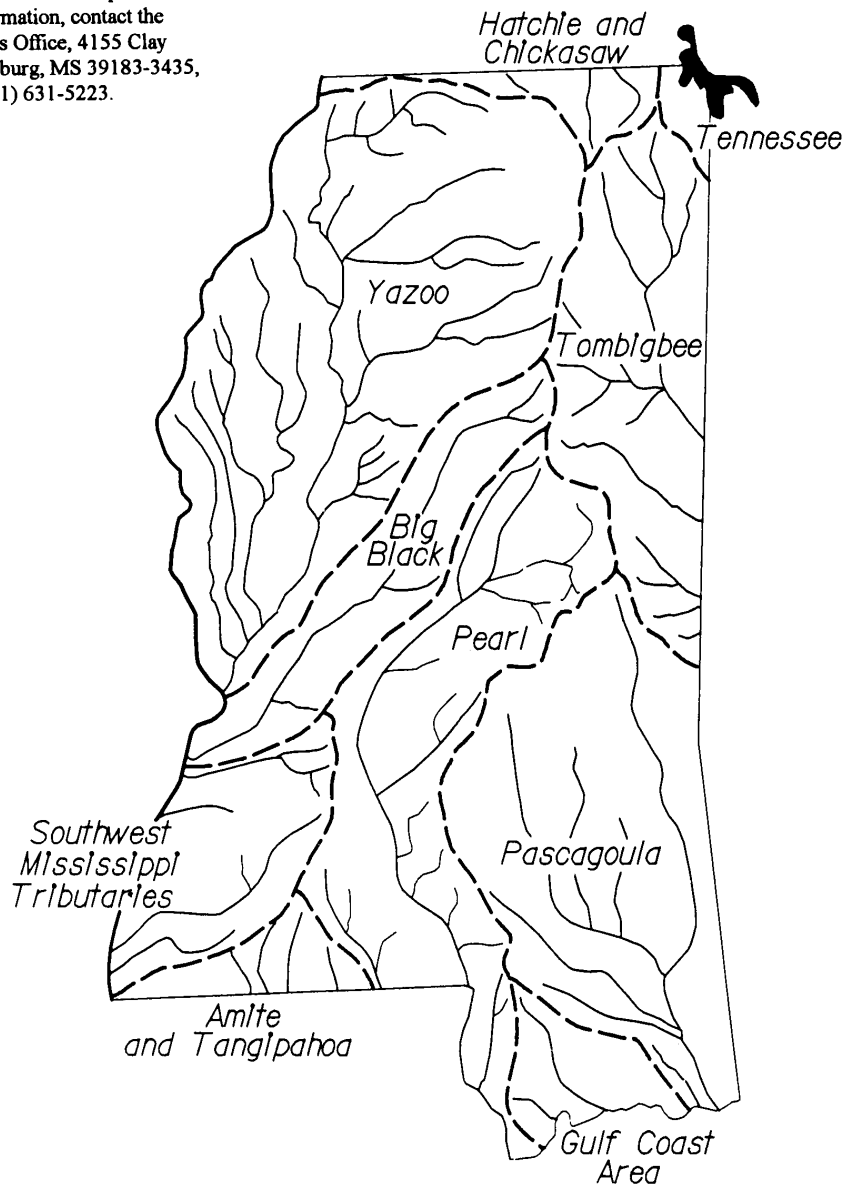
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Mississippi Water Resources Basins

This publication is compiled and edited by the U. S. Army Corps of Engineers' Vicksburg District. For additional copies or more information, contact the Public Affairs Office, 4155 Clay Street, Vicksburg, MS 39183-3435, or phone (601) 631-5223.





**US Army Corps
of Engineers
Vicksburg District**

Civil Works Overview

From 1775 to the present, the U.S. Army Corps of Engineers has served the Nation in peace and war. The Corps traces its history to June 1775, when the Continental Congress appointed Colonel Richard Gridley as Chief of Engineers of the Continental Army, under General George Washington. The original Corps was the Army's engineering and construction arm until it mustered out of service at the close of the Revolutionary War in 1783.

In 1802, Congress re-established a separate Corps of Engineers within the Army. At the same time, it established the U.S. Military Academy at West Point, the country's first, and for 20 years its only, engineering school. With the Army having the nation's most readily available engineering talent, successive Congresses and administrations established a role for the Corps as an organization to carry out both military construction and works "of a civil nature."

Throughout the nineteenth century, the Corps supervised the construction of coastal fortifications, lighthouses, several early railroads, and many of the public buildings in Washington, D.C., and elsewhere. Meanwhile, the Corps of Topographical Engineers, which enjoyed a separate existence for 25 years (1838- 1863), mapped much of the American West. Army Engineers served with distinction in war, with many engineer officers rising to prominence during the Civil War.

In its civil role, the Corps of Engineers became increasingly involved with river and harbor improvements, carrying out its first harbor and jetty work in the first quarter of the nineteenth century. The Corps' ongoing responsibility for federal river and harbor improvements dates from 1824, when Congress passed two acts authorizing the Corps to survey roads and canals and to remove obstacles on the Ohio and Mississippi Rivers. Over the years since, the expertise gained by the Corps in navigation projects led succeeding administrations and Congresses to assign new water-related missions to the Corps in such areas as flood control, shore and hurricane protection, hydropower recreation, water supply and quality, and wetland protection.

Today's Corps of Engineers carries out missions in three broad areas: military construction and engineering support to military installations, reimbursable support to other federal agencies (such as the Environmental Protection Agency's "Superfund" program to clean up hazardous and toxic waste sites); and the Civil Works mission, centered around navigation, flood control and under the Water Resources Development Acts of 1986, 1988, 1990, 1992, 1996 and 1999 - a growing role in environmental restoration.

Authorization and Planning of Water Resources Projects

Corps of Engineers water resources activities are normally initiated by non-federal interests, authorized by Congress, funded by a combination of federal and non-federal sources, constructed by the Corps under the Civil Works Program, and operated and maintained by the Corps or by a non-federal sponsoring agency.

The Water Resources Development Act of 1986 made numerous changes in the way potential new water resources projects are studied, evaluated, and funded. The major change is that the law now specifies greater non-federal cost sharing for most Corps water resources projects.

When local interests feel that a need exists for improved navigation, flood protection, or other water resources development, they may petition their representatives in Congress. A Congressional committee resolution or an act of Congress may then authorize the Corps of Engineers to investigate the problems and submit a report. Water resources studies, except studies of the inland waterway navigation system, are conducted in partnership with a non-federal sponsor, with the Corps and the sponsor jointly funding and managing the study.

For inland navigation and waterway projects, which are by their nature not 'local,' Congress, in the Water Resources Development Act of 1986, established an Inland Waterway Users Board comprised of waterway transportation companies and shippers of major commodities. This board advises the Secretary of the Army and makes recommendations on priorities for new navigation projects such as locks and dams. Such projects are funded in part from the Inland Waterway Trust Fund, which in turn is funded by waterway fuel taxes.

Normally, the planning process for a water resource problem starts with a brief reconnaissance study to determine whether a project falls within the Corps' statutory authority and meets national priorities. Should that be the case, the Corps district where the project is located will carry out a full feasibility study to develop alternatives and select the best possible solution. This process normally includes public meetings to determine the views of local interests on the extent and type of improvements desired. The federal, state, and other agencies with interests in a project are partners in the planning process.

Before making recommendations to Congress for project authorizations, the Corps ensures that the proposed project's benefits will exceed costs, its engineering design is sound, the project best serves the needs of the people concerned, and this project makes the wisest possible use of the natural resources involved and adequately protects the environment.

Once the Corps of Engineers district completes its feasibility study, it submits a report, along with a final environmental impact statement, to higher authority for review and recommendations. After review and coordination with all interested Federal agencies and the governors of affected states, the Chief of Engineers forwards the report and environmental statement to the Secretary of the Army, who obtains the views of the Office of Management and Budget before transmitting these documents to Congress. If Congress includes the project in an authorization bill, enactment of the bill constitutes authorization of the project. Before construction can get underway, however, both the federal government and the project sponsor must provide funds. A federal budget recommendation for a project is based on evidence of support by the state and the ability and willingness of a non-federal sponsor to provide its share of the project cost. Appropriation of money to build a particular project is usually included in the annual Energy and Water Development Appropriation Act, which must be passed by both Houses of the Congress and signed by the President.

Navigation

Corps of Engineers involvement in navigation projects dates to the early days of the United States when rivers and coastal harbors were the primary paths of commerce in the new country. Without its great rivers, the vast, thickly-forested region west of the Appalachians would have remained impenetrable to all but the most resourceful early pioneers. Consequently, western politicians such as Henry Clay agitated for federal assistance to improve rivers. At the same time, the War of 1812 showed the importance of a reliable inland navigation system to national defense.

There was, however, a question as to whether transportation was, under the Constitution, a legitimate federal activity. This question was resolved when the Supreme Court ruled that the Commerce Clause of the Constitution granted the federal government the authority, not only to regulate navigation and commerce, but also to make necessary navigation improvements.

The system of harbors and waterways maintained by the Corps of Engineers remains one of the most important parts of the nation's transportation system. The Corps maintains the nation's waterways as a safe, reliable and economically efficient navigation system. The 12,000 miles of inland waterways maintained by the Corps carry one sixth of the nation's inter-city cargo. The importance of the Corps mission in maintaining depths at more than 500 harbors, meanwhile, is underscored by an estimated one job in five in the United States being dependent, to some extent, on the commerce handled by these ports.

Flood Control and Flood Plain Management

Federal interest in flood control began in the alluvial valley of the Mississippi River in the mid-19th century. As the relationship of flood control and navigation became apparent, Congress called on the Corps of Engineers to use its navigational expertise to devise solutions to flooding problems along the river.

After a series of disastrous floods affecting wide areas in the 1920's and 30's, Congress determined, in the Flood Control Act of 1986, that the federal government would participate in the solution of flooding problems affecting the public interest that were too large or complex to be handled by states or localities. Corps authority for flood control work was thus extended to embrace the entire country. The Corps turns most of the flood control projects it builds over to non-federal authorities for operation and maintenance once construction is completed.

The purpose of flood control work is to prevent damage through regulation of the flow of water and other means. Prevention of flood-related damages can be accomplished with structural measures, such as reservoirs, levees, channels and flood walls that modify the characteristics of floods; or non-structural measures, such as flood plain evacuation, flood proofing and floodway acquisition, that alter the way people use these areas and reduce the susceptibility of human activities to flood risk.

Corps flood control reservoirs are often designed and built for multiple-purpose uses, such as municipal and industrial water supply, navigation, irrigation, hydroelectric power, conservation of fish and wildlife, and recreation.

The Corps fights the nation's flood problems not only by constructing and maintaining structures, but also by providing detailed technical information on flood hazards. Under the Flood Plain Management Services Program, the Corps provides, on request, flood hazard information, technical assistance and planning guidance to other federal agencies, states, local governments and private citizens. Once community officials know the flood-prone areas in their communities and how often floods would be likely to occur, they can take necessary action to prevent or minimize damages to existing and to new buildings and facilities, such as adopting and enforcing zoning ordinances, building codes, and subdivision regulations. The Flood Plain Management Services Program provides assistance to other federal and state agencies in the same manner.

Shore and Hurricane Protection

Corps work in shore protection began in 1930, when Congress directed the Corps to study ways to reduce erosion along U.S. seacoasts and the Great Lakes. Hurricane protection work was added to the erosion control mission in 1955, when Congress directed the Corps to conduct investigations along the Atlantic and Gulf Coasts to identify problem areas and determine the feasibility of protection.

While each situation the Corps studies involves different considerations, Corps engineers always consider engineering feasibility and economic efficiency along with the environmental and social impacts. Federal participation in a shore protection project varies, depending on shore ownership, use and type and frequency of benefits. (If there is no public use or benefit, the Corps will not recommend federal participation.) Once the project is complete, non-federal interests assume responsibility for its operation and maintenance.

Eighty-two federal shore protection projects along the coasts of the Atlantic, Pacific, Gulf of Mexico and the Great Lakes protect a total of 226 miles of shoreline. Total investment in these projects since 1950 has been \$674 million, of which \$405 million was provided by the federal government, the rest by non-federal sponsors.

One shore protection method popular in seaside communities is beach nourishment-the periodic replenishment of sand along the shoreline to replace that lost to storms and erosion. Authorized nourishment projects usually have a nourishment period of 50 years. In addition, Section 145 of the Water Resources Development Act of 1976 authorizes placement of beach quality sand from Corps dredging projects on nearby beaches. Under Section 933 of the Water Resources Development Act of 1986, local sponsors pay the federal government 50 percent of the additional costs of this sand placement sand.

Hydropower

The Corps has played a significant role in meeting the nation's electric power generation needs by building and operating hydropower plants in connection with its large multiple-purpose dams. The Corps' involvement in hydropower generation began with the Rivers and Harbors Acts of 1890 and 1899, which required the Secretary of War and the Corps of Engineers to approve the sites and plans for all dams and to issue permits for their construction.

The Rivers and Harbors Act of 1909 directed the Corps to consider various water uses, including water power, when submitting preliminary reports on potential projects.

The Corps continues to consider the potential for hydroelectric power development during the planning process for all water resources projects involving dams and reservoirs. In most instances today, it is non-federal interests who develop hydropower facilities at Corps projects without federal assistance.

The Corps, however, can plan, build and operate hydropower projects when it is impractical for non-federal interests to do so. Today, the more than 2,000 megawatts of capacity at Corps-operated power plants provide approximately 24 percent of the nation's hydroelectric power, or three percent of its total electric energy supply.

Water Supply

Corps involvement in water supply dates back to 1853, when it began building the Washington Aqueduct, which provides water to the nation's capital city and some of its suburbs to this day.

Elsewhere in the nation, the Water Supply Act of 1958 authorized the Corps to provide additional storage in its reservoirs for municipal and industrial water supply at the request of local interests, who must agree to pay the cost. The Corps also supplies water for irrigation, under terms of the Flood Control Act of 1944. This act provided that the Secretary of War, upon the recommendation of the Secretary of the Interior, could allow use of Corps reservoirs for irrigation, provided that users agree to repay the government for the water.

Recreation

The Flood Control Act of 1944, the Federal Water Project Recreation Act of 1965, and language in specific project authorization acts authorize the Corps to construct, maintain, and operate public park and recreational facilities at its projects, and to permit others to build, maintain, and operate such facilities. The water areas of Corps projects are open to public use for boating, fishing, and other recreational purposes.

The Corps of Engineers today is one of the federal government's largest providers of outdoor recreational opportunities, operating more than 4,300 sites at its lakes and other water resource projects. More than 370 million visits per year are recorded at these sites. State and local park authorities and private interests operate nearly 2,000 of these areas at Corps projects.

Environmental Quality

The Corps carries out the Civil Works Programs in consistency with many environmental laws, executive orders and regulations. Perhaps primary among these is the National Environmental Policy Act (NEPA) of 1969. This law requires federal agencies to study and consider the environmental impacts of their proposed actions. Consideration of the environmental impact of a Corps project begins in the early stages, and continues through design, construction and operation of the project. The Corps must also comply with these environmental laws and regulations in conducting its regulatory programs.

NEPA procedures ensure that public officials and private citizens may obtain and provide environmental information before federal agencies make decisions concerning the environment. In selecting alternative project designs, the Corps strives to choose options with minimum environmental impact.

The Water Resources Development Act of 1986 authorizes the Corps to propose modifications of its existing projects - many of them before current environmental requirements were in effect - for environmental improvement. Proposals the Corps has

made under this authority range from use of dredged material to create nesting sites for waterfowl to modification of water control structures to improve downstream water quality for fish.

In recent years the Corps of Engineers has planned and recommended environmental restoration actions at federal projects to restore environmental conditions.

Regulatory Programs

The Corps of Engineers regulates construction and other work in navigable waterways under Section 10 of the Rivers and Harbors Act of 1899, and has authority over the discharge of dredged or fill material into the “waters of the United States” - a term which includes wetlands and all other aquatic areas - under Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500, the “Clean Water Act”). Under these laws, those who seek to carry out such work must first receive a permit from the Corps.

The “Section 404” program is the principal way by which the federal government protects wetlands and other aquatic environments. The program’s goal is to ensure protection of the aquatic environment while allowing for necessary economic development.

The permit evaluation process includes a public notice and a public comment period. Applications for complex projects may also require a public hearing before the Corps makes a permit decision. In its evaluation of applications, the Corps is required by law to consider all factors involving the public interest. These may include economics, environmental concerns, historical values, fish and wildlife, aesthetics, flood damage prevention, land use classification, navigation, recreation, water supply, water quality, energy needs, food production and the general welfare of the public.

The Corps of Engineers has issued a number of nationwide general permits, mostly for minor activities which have little or no environmental impact. Individual Corps districts have also issued regional permits for certain types of minor work in specific areas. Individuals who propose work that falls under one of these general or regional permits need not go through the full standard individual permit process. However, many general permit authorizations do involve substantial effort by the Corps, and often require project-specific mitigation for the activities authorized by the permit. Corps districts have also issued State Program General Permits for work in states that have comprehensive wetland protection programs. These permits allow applicants to do work for which they have received a permit under the state program. These general permits reduce delays and paperwork for applicants and allow the Corps to devote most of its resources to the more significant cases while maintaining the environmental safeguards of the Clean Water Act.

Emergency Response and Recovery

The Corps provides emergency response to natural disasters under Public Law 84-99, which covers flood control and coastal emergencies. It also provides emergency support to other agencies, particularly the Federal Emergency Management Agency (FEMA), under Public Law 93-288 (the Stafford Act) as amended.

Under P.L. 84-99, the Chief of Engineers, acting for the Secretary of the Army, is authorized to carry out disaster preparedness work, advance measures, emergency operations such as flood fighting, rescue and emergency relief activities, rehabilitation of flood control works threatened or destroyed by flood and protection or repair of federally authorized shore protection works threatened or damaged by coastal storms. This act also authorizes the Corps to provide emergency supplies of clean water in cases of drought or contaminated water supply. After the immediate flooding has passed, the Corps provides temporary construction and repairs to essential public utilities and facilities and emergency access for a 10- day period, at the request of the governor and prior to a Presidential Disaster Declaration.

Under the Stafford Act and the Federal Response Plan, the Corps of Engineers, as designated by the Department of Defense, is responsible for providing public works and engineering support in response to a major disaster or catastrophic earthquake. Under this plan, the Corps, in coordination with FEMA, will work directly with state authorities in providing temporary repair and construction of roads, bridges, and utilities, temporary shelter, debris removal and demolition, water supply, etc. The Corps is the lead federal agency tasked by FEMA to provide engineering, design, construction, and contract management in support of recovery operations.



**US Army Corps
of Engineers
Vicksburg District**

Mississippi River Commission

The Mississippi River Commission (MRC) was created by an Act of Congress in 1879 to improve navigation and flood control on the Mississippi River. The MRC was, and is, composed of seven members who are nominated by the President of the United States and confirmed by the Senate.

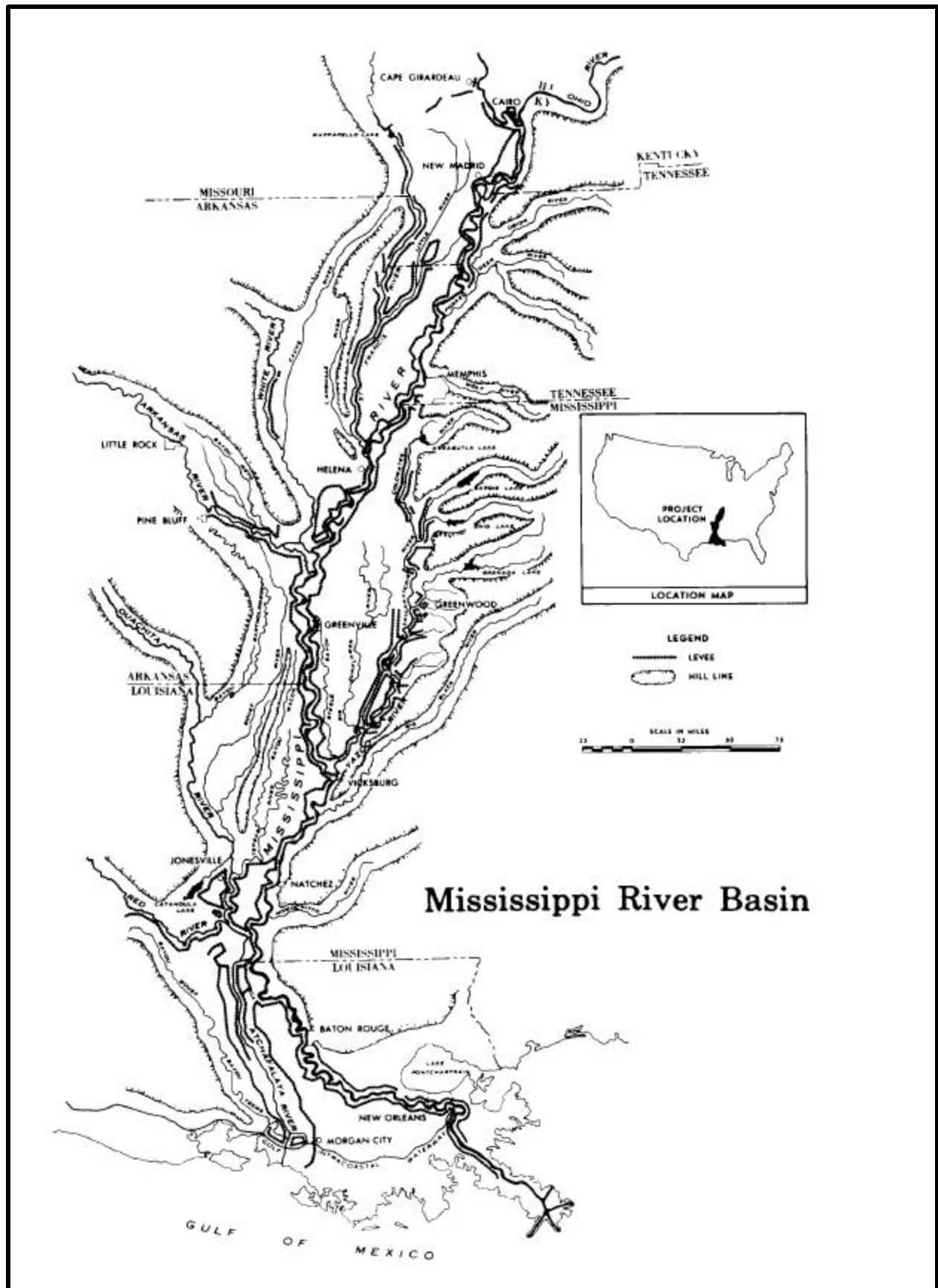
Until the tremendous Flood of 1927, the MRC's main emphasis was on river improvements for navigation. After the flood, however, Congress passed the 1928 Flood Control Act committing the federal government to a comprehensive program of flood control and authorizing the Mississippi River and Tributaries (MR&T) project. The original act has been amended 24 times to adapt to changing conditions and requirements.

Physical construction in the total MR&T project is about 87 percent complete and is designed to control a "project design flood" with a discharge of 3 million cubic feet per second. This hypothetical project flood is based on the maximum probable runoff from the artificial combination of the most severe rainstorms which have actually occurred at critical points of the basin. The plan is composed of four major features: levees, floodways, channel improvement, and tributary basin improvement. Levees are the backbone of the system and cover more than 2,000 miles along the Mississippi River and principal tributaries extending from Cape Girardeau, Missouri, to Venice, Louisiana. Their purpose is to confine floodwaters to the main channel and designated floodways.

Four floodways exist in the MR&T project to divert excess flows in critical locations. The northernmost one is Birds Point-New Madrid in Missouri which was used once, in 1937. The other three, West Atchafalaya, Morganza, and Bonnet Carre, are in Louisiana. West Atchafalaya has never been used, and Morganza was used once, in 1973. However, Bonnet Carre, located just upstream of New Orleans, was the first floodway completed and has been opened eight times: 1937, 1945, 1950, 1973, 1975, 1979, 1983, and 1997. The main components of channel improvement and stabilization are cutoffs, revetments, dikes, and dredging. This work is designed to protect the levees, increase the flood carrying capacity, and improve navigation.

Tributary basin improvement work includes flood control dams, channel improvements, and interior drainage. The four major basins are the St. Francis, Yazoo, Tensas, and Atchafalaya. The Mississippi River and tributaries drain an area of 1.25 million square miles involving 31 states and two Canadian provinces. This involves about 41 percent of the total U.S. land area, excluding Alaska and Hawaii. As water collects from this vast drainage basin - the fourth largest in the world - it has only one way to go, through the lower Mississippi River starting at its juncture with the Ohio River at Cairo, Illinois.

The total authorized cost of the MR&T Project including all modifications is 12.7 billion. Expenditures to date amount to 7.2 billion, with annual maintenance averaging \$130 million over the last five years. Accumulated benefits of the project amount to \$243.9 billion cumulative through 1999. A good part of the benefits has been in preventing damages from flood losses.



Mississippi River

The Mississippi River has a major impact on the economic and social well being of the nation. The river and its tributaries form a major transportation artery for the center of the country. Tremendous amounts of goods, both raw materials and finished products, move along this system from producer to consumer, at home and overseas. If left uncontrolled, the river would wreak havoc on people and facilities along its path.

Water from parts of 31 states and 2 Canadian provinces is drained by this system through the lower Mississippi River. The 1.25 million square miles of drainage makes this the fourth largest drainage basin in the world and involves 41 percent of the total land area of the United States, excluding Alaska and Hawaii. Except for portions of the backwater areas, floodways, and the area between the protective levees, the alluvial valley is a highly developed agricultural and industrial region. Agricultural development is spread across the entire region with major industrial development concentrated near urban centers.

As a result of the Flood of 1927, national attention was focused on the need to control this important waterway. The MRC was given the responsibility for accomplishment of the MR&T Project set forward in the Flood Control Act of 1928.

Projects

Claiborne County Port ***(Vicksburg District)***

Construction of a slack-water port at River Mile 405 above Head of Passes was essentially completed in 1983 under Section 107 of the Rivers and Harbors Act of 1960, as amended. Initial total first cost for constructing the port, a 10-acre industrial landfill at elevation 92 feet, National Geodetic Vertical Datum NGVD and an elevated access road was approximately \$7.5 million or \$2 million federal and \$5.5 million non-federal. The port consists of an 800-foot-long and 150-foot-wide access channel and a 400-by-800-foot turning and port basin with additional 50-foot fleeting and berthing areas on the north and south sides.

Greenville Harbor ***(Vicksburg District)***

The Greenville Harbor Project was completed in 1963. The harbor and port area was constructed on Lake Ferguson, an old bendway of the Mississippi River, just southwest of the city of Greenville, Mississippi.

The purpose of the project was to provide a slack-water harbor with entrance channel and harbor channel adequately connected with the Mississippi River and accessible at all river stages. Greenville Harbor is connected to the Mississippi River by a channel of the same depth and 250 feet in width. The port area, constructed with the dredged material, is 1,000 feet wide and 5,000 feet long and about 25 feet high, forming an area of about 115 acres. Elevation at the port area is 148 feet, NGVD.

All usable sites on the industrial fill or port area are occupied or committed to development. Private and public terminal facilities are operating at the Greenville Harbor site with a total movement of 1.9 million tons in 1997. Commodities moving through these terminals include agricultural products; sand, gravel, and stone products; textile products; chemicals and allied products; metal products; and manufactured goods and products. Waterborne commerce in the area has benefited from the harbor project. In 1987, \$1.96 million worth of commodities were shipped or received through the Greenville, Mississippi area. Projections indicate that commerce in the area will continue to increase.

A report prepared by the Vicksburg District, Corps of Engineers, in 1972 indicated that additional navigation improvements were warranted for the Greenville Harbor area. The report recommended a new project, which would provide additional harbor channels, accessible at all river stages. In 1974, additional studies were authorized for Greenville Harbor. These studies included reviewing and updating information used previously and conducting new studies, as required to establish a sound plan for harbor improvements.

The recommended improvements included widening the existing entrance channel into Greenville Harbor from 250 feet to 500 feet for a distance of approximately 8,000 feet and dredging an inner harbor channel into the area adjacent to the existing harbor project. The inner harbor channel would have been 500 feet wide and about 13,300 feet long. All channels, including fleeting and berthing areas, would have an authorized depth of 12 feet at the lowest river stages.

A 9-foot channel would be constructed and maintained until a depth of 12 feet was monitored on the Mississippi River. The dredged material from construction of the harbor and disposal areas adjacent to the inner harbor channel improvements would be placed in a 280-acre flood-free industrial landfill to elevation 150 feet, NGVD. An 80-acre landfill of elevation 136 feet, NGVD, subject to infrequent flooding, would result from the disposal operations.

In 1984, the Assistant Secretary of the Army (Civil Works) stated that the recommended development is not appropriate for implementation by local interests in response to market conditions. He also recommended that no further planning or development by the Corps of Engineers be undertaken at this time. The recommended project was authorized for construction by the Water Resources Development Act of 1986, (P.L. 99-662).

Mississippi River and Tributaries Channel Improvements **(MRC)**

Modern improvements designed to facilitate navigation on the Mississippi River below Cairo, Illinois, have also provided flood control benefits. These were authorized first by the Flood Control Act of 1928 and 1944. Dikes, concrete revetments, and dredging have helped to hold the river in a fixed course while also reducing flood heights. Bank stabilization on the Mississippi River is important to both flood control and navigation. The only effective way to protect banks from erosion and caving has been revetment, a protective concrete layer underwater and a stone pavement above the waterline.

In addition, other work on the Mississippi River between Cairo and Baton Rouge includes: removing snags; wrecks, and obstructions; providing daily gauge readings and three day forecasts at regular MRC gauge locations using the Vicksburg District web page as well as an automated telephone service; contacting pilot-service; and furnishing navigation interests with the latest information.

There were 16 cutoffs on the Mississippi River, which were developed between 1933 and 1942 in carrying out authorized channel improvements between Baton Rouge and Cairo. The measures, combined with other improvements, actually decreased the channel length by 170 miles between the two cities. River velocities, however, increased the attack on the banks, and the river started to regain its length. As a result, the net shortening from 1933 to 1962 was 114 miles of the theoretical 170-mile cutoff.

Between Cairo and Head of Passes, there are 1,031.6 miles of operative bank revetment and 301.4 miles of dikes in place. A navigation channel 9 feet deep by 300 feet wide is being achieved by revetment and dikes, and during low- water season, by dredging where required. Average maintenance requirements for dredging are showing a steady reduction due to the growing effectiveness of channel improvement programs. An increase in the navigable depth is also being obtained. Approximately 141 miles of foreshore protection for that part of the shore uncovered at low tide has been constructed along the lower Mississippi River.

Mississippi River and Tributaries-Levees **(MRC)**

Mainline Mississippi River levees in the lower valley are considered one system when describing the project. Levees, which protect one particular area, also influence the degree of protection afforded areas downstream. On the Mississippi River there are 1609.8 miles of levees in the protective system authorized below Cape Girardeau with 1603 miles in place, including 1327.7 miles built to approved grade and section by September 30, 1999.

The Main Stem Levee System is a line of protection 2203.6 miles long of which 2196.8 miles are in place with 1847.3 miles completed to approved grade and section.

Currently 558.3 miles of 677.8 authorized miles of berm are completed, and 2094.8 miles of graveled or hard-surfaced roads have been constructed on these main stem levees. In addition 1,511 miles of tributary levees have been authorized off the main stem. To date, 1225.2 miles are in place with 1031.8 miles completed to approved grade and section. Berms are completed on 15.3 miles of these levees, while 916.2 miles of graveled or hard surfaced roads have been constructed.

Status of Litigation on Mississippi River Mainline Levee Enlargement Project

The Earthjustice Legal Defense Fund, Inc., filed suit on October 2, 1996, on behalf of several clients (hereinafter Earthjustice), challenging the adequacy of the 1976 Environmental Impact Statement (EIS) for the ongoing Mississippi River mainline levee enlargement and berm construction feature of the Mississippi River and Tributaries project. A Consent Decree was signed with the plaintiffs on June 17, 1997, to facilitate continued construction of certain project features during the preparation of the Supplemental Environmental Impact Statement (SEIS). The SEIS was completed in the fall of 1998. On October 5, 1998, MG Phillip R. Anderson signed the Record of Decision finding that the recommended plan entitled "Alternative 4, Avoid and Minimize" not only provided the necessary flood protection, but was also the environmentally preferable plan.

On December 4, 1998, Earthjustice filed its challenge to the SEIS in the Federal District Court for the Eastern District of Louisiana and alleged breach of the Consent Decree. By this litigation, Earthjustice did not seek to enjoin or halt construction via an injunction. Accordingly, construction continued to proceed. On September 8, 1999, Judge Vial Lemmon, U.S. District Court Judge for the Eastern District of Louisiana, ruled in favor of the U.S. and the local sponsor. Judge Lemmon concluded that the Corps' SEIS complied with the National Environmental Policy Act because it provided the public detailed information concerning the environmental impacts and explored and evaluated all reasonable alternatives. Plaintiffs filed an appeal to the U.S. Court of Appeals for the Fifth Circuit on November 3, 1999. Oral arguments on the appeal were held August 9, 2000. The Corps won the Appeal in November 2000.

Mississippi River Cairo, Illinois, to Baton Rouge, Louisiana (MRC)

Channel improvement is an integral part of the MR&T Project as authorized by the Flood Control Act of 1928 and its latter amendments. Involved, in addition to the project's flood control features, are provisions for construction maintenance of a navigable channel from Cairo to Baton Rouge. The lower Mississippi is the main stem of a proven and dependable navigation system of about 12,500 miles of natural and man-made waterways having a navigable depth of 6 feet or more. It is vital to the continued growth of the United States.

In 1896 Congress authorized a navigation channel 9 feet deep and 250 feet wide at low water, between Cairo and Head of Passes. A width of 300 feet was authorized in 1928. In 1944 the authorized depth from Cairo to Baton Rouge was increased to 12 feet at low water. Width remained at 300 feet. Along this 725-mile segment, a minimum low water navigation channel 9 feet deep and 300 feet wide is maintained through dredging and other control measures. In 1998, 195.9 million tons of commodities moved in this reach.

Off-Main Stem Flood Control (MRC)

The MR&T Project also provides for supplementary flood control improvements off the main stem of the Mississippi River, providing local flood protection in these areas of the lower valley: the St. Francis and Little River Basins in Missouri and Arkansas; at Cairo, Illinois, and vicinity; along the east bank tributaries in western Kentucky, and Tennessee; in the lower White and Arkansas River Basins; the Bayou Meto Basin and the Grand Prairie region in Arkansas; in the Tensas River Basin in Arkansas and Louisiana; in the Atchafalaya Basin in Louisiana, and in the Yazoo Basin in Mississippi.

Natchez Bluff Stabilization, Natchez, Mississippi (Vicksburg District)

The “historic” bluff line at Natchez is located on the east bank of the Mississippi River. Bluff erosion and failure have endangered or destroyed historically significant public and private property and resulted in fatalities.

The Corps Project, as authorized by the WRDA, 1996, extends along the bluff line for approximately 1 mile from “Natchez Under the Hill,” located just north of the U.S. Highway 84 Bridge at river mile 363.3, to the intersection of Park Avenue with Clifton Avenue. The project provides for stabilizing the bluff face using a combination of retaining walls and reinforced earth techniques. There are four designated work reaches: Clifton Avenue-Learned Mill Road, Area 3; Madison Street to State Street, Area 4; Bluff Above Silver Street, Area 6; and Bluff Above “Natchez Under-the-Hill”, Area 7. The City of Natchez is the project sponsor.

Funds totaling \$14,500,000 were appropriated in fiscal years 1997 through 2000. Corps construction of bluff stabilization measures along the top priority work reach, Area 3, was initiated and completed in 1998 and 1999, respectively. A portion of Area 3 also received bluff stabilization treatment under the Natural Resources Conservation Service Emergency Watershed Protection Program in 1997. Initiation of construction on the second priority work reach, Area 4, was initiated in 1999 and is scheduled to be complete in early 2001. Proposals for construction of the last 2 work reaches under one contract, Areas 6 and 7, were received in early July 2000. This last contract is scheduled to be awarded in August 2000, and construction is scheduled to begin in late October 2000 and be completed approximately one year thereafter.

Studies

Hatcher Bayou and Durden Creek, Warren County ***(Vicksburg District)***

A detailed project report was completed in July 1979. The report contains the results of analyses of various plans designed to provide flood protection for lands lying in the lower portion of the Hatcher Bayou-Durden Creek drainage basin. Due to urban development in the study area and the associated increased rainfall runoff, flooding of the area had become a serious problem. Channel improvement was selected as the best plan for the affected area. However, because of the inability of the local sponsor to execute the local cooperation agreement no further action was taken.

Lake Whittington Weir ***(Vicksburg District)***

Environmental restoration studies of Lake Whittington, Mississippi, and Arkansas, were initiated in June 1994 under Section 1135 of the Water Resources Development Act of 1986. In particular, the study investigated the need for a weir in the inlet/outlet channel from Lake Whittington to the Mississippi River to maintain a minimum lake elevation to restore fish and wildlife resources of the lake. Various weir elevations were considered to determine impacts to fish and wildlife and other resources. The Bolivar County Board of Supervisors is the project's sponsor. A report documenting study findings was completed in June 1996.

The Mayersville Port ***(Vicksburg District)***

A reconnaissance study to evaluate the feasibility of providing port facilities on the Mississippi River near Mayersville was completed in 1980. A detailed analysis of both on-river and off-river facilities was subsequently undertaken. The detailed study has been completed and recommended no further federal action.

Mississippi River, **East Bank, Natchez Area** ***(Vicksburg District)***

The Water Resources Development Act of 1974 (P.L. 93-251) authorized Legislative Phase I Advance Engineering and Design studies for the Natchez area. The purpose of these investigations was to reaffirm or modify the plan recommended in a 1971 report concerning the east bank from Warren to Wilkinson counties, Mississippi. The Phase I studies, initiated in 1975, revealed that the previously recommended plan, which

consisted of a 12.4-mile levee system to protect 16,400 acres from the Mississippi River project flood, was no longer economically justified.

The Phase I studies were reactivated in April 1983 as a result of congressional and local interest. However, these studies were terminated in 1986 because they were not in accordance with Corps policy regarding economic justification, agricultural production, and land use.

The Energy and Water Development Appropriations Act of 1988 directed the Secretary of the Army to complete the Phase I studies for the Natchez area. A final report was completed in 1989, concluding that federal participation was not warranted.

Mississippi River, East Bank,
Vicksburg- Yazoo Area
(Vicksburg District)

Authorization was provided in 1974 to conduct advance engineering and design studies for the Vicksburg Yazoo area plan presented in a 1970 survey report. The plan consists of a levee, pumping plant, floodgates, culverts, and interior channel improvements. The structure would provide protection from the project design flood for lands lying in the east bank flood plain of the Mississippi River northwest of Vicksburg in Warren County. Results of the studies indicated that the authorized plan was not economically justified at that time. Completion of the study is being delayed to allow coordination of the project with other projects authorized or proposed in the study area. However, the study was subsequently deauthorized in accordance with provisions of the Water Resources Development Act of 1986 (P.L. 99-662).

Yazoo Diversion Canal
(Vicksburg District)

A draft detailed project report recommending widening of the Yazoo Diversion Canal from its mouth at the Mississippi River to the Vicksburg Harbor Project, a distance of approximately 3 miles was completed in March 2000. The recommended plan consists of widening of the Canal to accommodate a four-barge tow configuration. Channel dimensions would be approximately 260-foot bottom width from the mouth of the Canal to Glen Bayou located above the Vicksburg City waterfront. From Glen Bayou to the Vicksburg Harbor Project, a 185-foot bottom-width channel would be maintained. The channel would be constructed with a bottom elevation of 33 feet, NGVD. The project has an estimated cost of \$3,875,000. The City of Vicksburg and the Warren County Port Commission is the board sponsor for the project. The final report is scheduled to be completed in October 2000.

Flood Plain Management

Hatcher Bayou and Tributaries ***(Vicksburg District)***

Report indicated location of potential flood-prone areas affecting residential and commercial properties in the vicinity of south Vicksburg on Hatcher Bayou, Durden Creek, and Stouts Bayou. Report published in 1975.

Lake Ferguson, Main Canal, and Black Bayou ***(Vicksburg District)***

Study area extended 5 miles upstream and downstream from Greenville on the Mississippi River (Lake Ferguson), Main Canal, and Black Bayou. Study indicated flood-prone areas affecting agricultural, residential, and commercial properties. Report published in 1971.

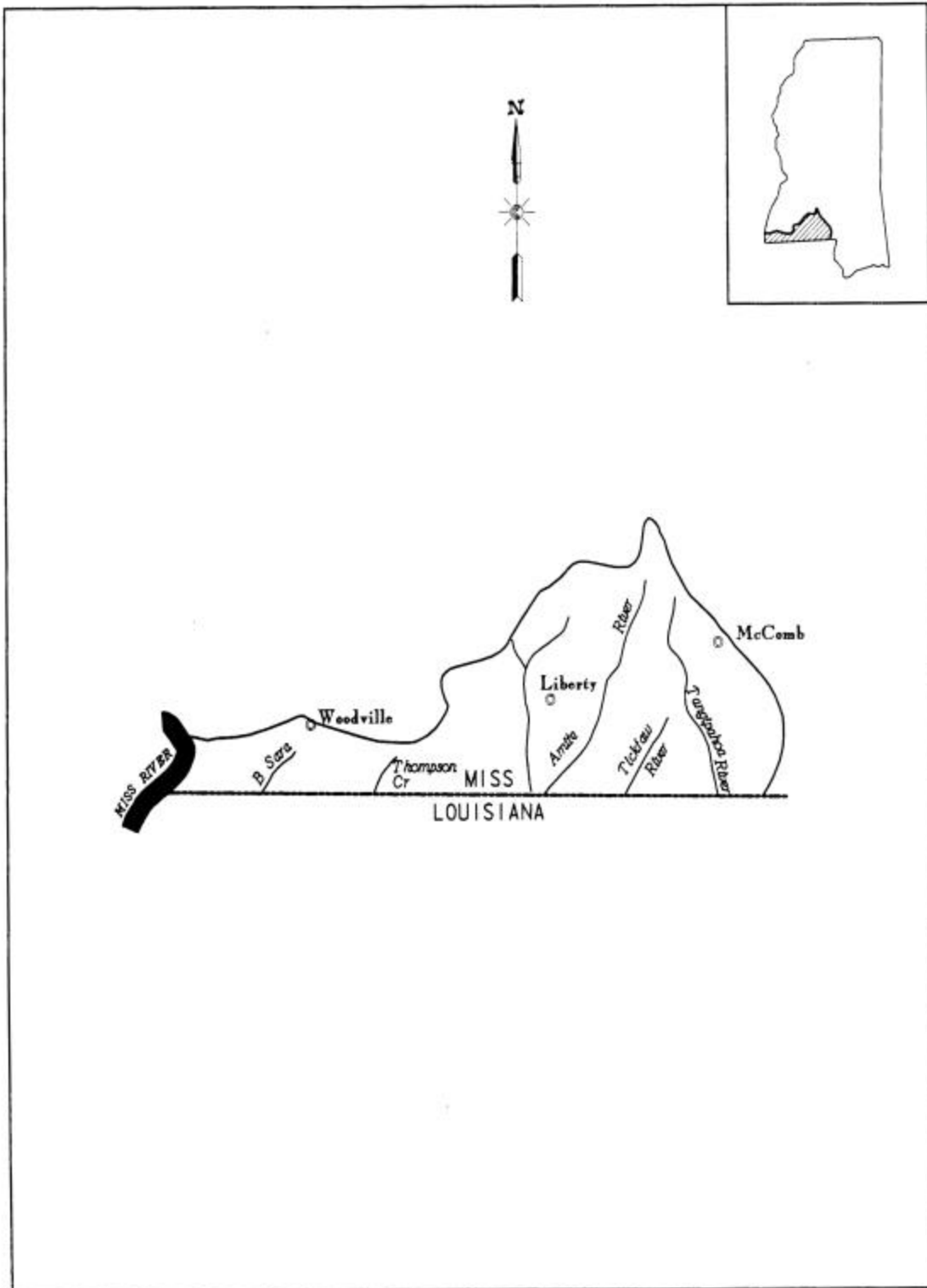
Mississippi and Yazoo Rivers at Vicksburg ***(Vicksburg District)***

Report on the Mississippi River at Vicksburg and vicinity directed attention to flood-prone residential and industrial areas along western portion of the city of Vicksburg. Report published in 1968.

Mississippi River at Natchez ***(Vicksburg District)***

Report on Natchez and vicinity on the Mississippi River directed attention to potential flooding of residential and commercial alluvial lands along 20-mile area of east bank of the Mississippi River. Report published in 1969.

Amite and Tangipahoa River Basins



Amite and Tangipahoa River Basins

The Amite and Tangipahoa Rivers are two of the major streams in the Pontchartrain Basin. The Amite River rises in the hills of southwestern Mississippi and flows in a south and southeasterly direction, a distance of 170 miles through pine-covered hills and timbered swamp, to the western side of Lake Maurepas in southeastern Louisiana. The Tickfaw River, located east of the Amite River, begins in southwestern Mississippi southwest of McComb, flows in a southerly direction for about 100 miles, and enters the northern end of Lake Maurepas.

The Tangipahoa River, located east of the Tickfaw River, rises in southwestern Mississippi near McComb, flows in a southerly direction about 110 miles, and enters Lake Pontchartrain on the north shore near the western end of the lake. Two tributaries of Mississippi River (Bayou Sara and Thompson Creek), located west of the Amite River, also have their source in southwestern Mississippi in Wilkinson County. The upper portion of the Amite and Tangipahoa River Basins is located in southwestern Mississippi. The terrain consists of rolling hill lands largely covered by pine forests with streams confined in well-defined valleys. Elevation near McComb, Mississippi, is about 500 feet, NGVD.

The Amite and Tangipahoa River Basins are within the jurisdictional boundary of the New Orleans District. Presently, no projects are under way in the Mississippi portion of the Amite and Tangipahoa River Basins.

Studies

Amite River Tributaries ***(New Orleans District)***

The purpose of the study is to investigate the feasibility of providing improvements for flood control and other water related needs, including water supply, water quality control, recreation, and fish and wildlife enhancement. The study area has experienced four major floods between 1972 and 1983: 1973, 1977, 1979 and 1983. Flood damages in 1983 exceeded \$170 million. A reconnaissance scope study was initiated in 1983 and completed in 1984. The reconnaissance study indicated that enough of the improvements were economically feasible to warrant proceeding to the feasibility phase. Feasibility phase studies were initiated in 1985.

The Feasibility Phase was divided into five flood control studies. They are:

1. Comite River Basin
2. East baton Rouge Parish
3. Livingston Parish
4. Ascension Parish
5. Darlington Reservoir

The Comite River Diversion project was authorized for construction by the Water Resources Development Acts of 1992 and 1996. The Darlington Reservoir Feasibility Study was completed in September 1992. It was determined that the construction of a flood control dam and reservoir on the upper Amite River is not economically feasible. The FY 96 Appropriations Act included \$200,000 to complete a reconnaissance level restudy of the Darlington Reservoir.

Additional funds have been provided and the reconnaissance study was completed in September 1997. Feasibility studies will be conducted contingent on identifying a cost-sharing partner. Ascension Parish constructed flood control measures on their own and studies are planned to evaluate Federal participation in the need for additional work.

A feasibility report for East Baton Rouge Parish was completed in December 1996 and the project is awaiting Congressional authorization. Planning, Engineering and Design studies have been initiated. A report recommending no Federal action for Livingston Parish was completed in 1997.

Amite River and Tributaries **Ecosystem Restoration Study** ***(New Orleans District)***

This study was authorized by a resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives adopted on July 23, 1998. The study area included the 2,200-square-mile Amite River drainage basin in southeastern Louisiana and southwestern Mississippi.

The basin includes portions of East Baton Rouge, Ascension, Livingston, East Feliciana, St. Helena, Iberville, St. James and St. John the Baptist Parishes in Louisiana and Wilkinson, Franklin, Lincoln, and Amite Counties in Mississippi. Portions of the Amite River area classified as a scenic stream.

The reconnaissance study will determine the feasibility of restoring the Amite River Ecosystem to a less-degraded, more natural state. This effort will consider the physical, and biological aspects of the site, within the context of the entire watershed, to address all related issues and constraints.

The aspects of water quality, erosion control, recreation, and the avoidance of minimization of undesirable impacts resulting from urbanization and other present and future watershed activities will be investigated.

A comprehensive approach will be taken considering aquatic as well as, wetland and terrestrial complexes, to provide for long-term health of a more natural and diverse system. The inflated heel-splitter clam, a threatened species, exists in the basin and its habitat is likely being affected by the degraded stream conditions.

Fish and wildlife habitat has been directly degraded in approximately 25 miles of the Amite River, with potentially many more miles indirectly impacted. This degradation is believed to have been caused by urbanization, sand and gravel mining, agricultural and forestry practices over the last 50 years.

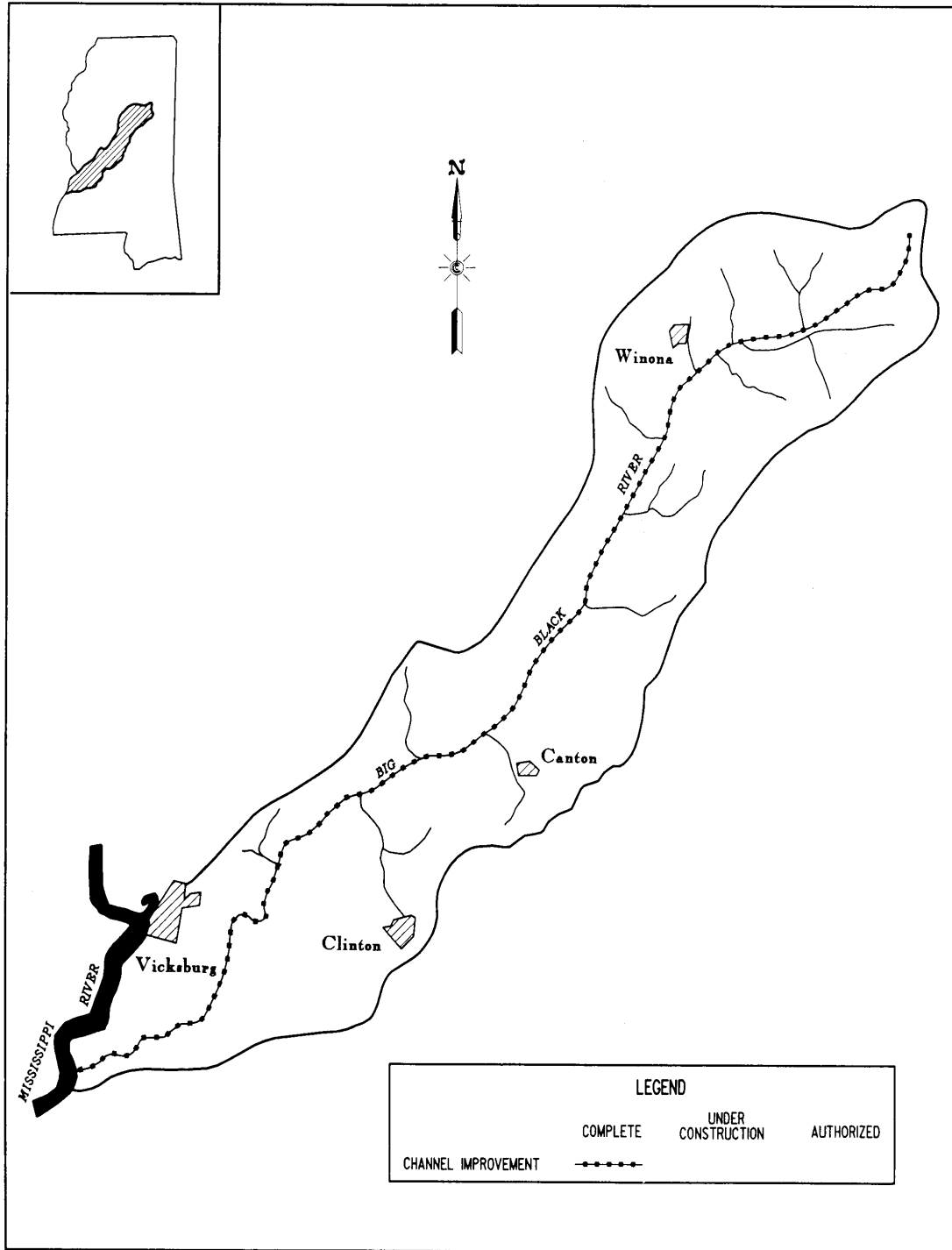
Bottomland hardwoods, other forested habitats, and biodiversity continue to decrease as vegetation is removed. Approximately 10,000 to 12,000 acres have been directly disturbed in the study area. The degradation included a reduction in wildlife habitat, stream and floodplain environment, and aggravation of existing flooding problems.

Problems can be attributed to the following: wider floodplain and shallower water depths, reduction in river length and the resulting steepened river gradient, reduction of the sinuosity through meander cut-offs, increased turbidity, and an increase in the unvegetated area and man-made changes within the river corridor.

As the habitat deteriorates, wildlife that use the river and floodplain ecosystem decrease in quantity, quality, and diversity. The study will determine the feasibility of restoring the Amite River ecosystem to a less-degraded, more natural system. The potential non-federal sponsor for this study in the State of Louisiana.

The reconnaissance study was initiated in November 1999 and is scheduled for completion in November 2000. The scope and schedule for the feasibility study have not yet been formulated.

Big Black River Basin



Big Black River Basin

The Big Black River Basin is located in west-central Mississippi and has a drainage area of about 3,400 square miles. The Big Black River begins in the eastern part of Webster County, Mississippi, and flows about 270 miles in a southwest direction to its outlet into the Mississippi River, 25 miles south of Vicksburg, Mississippi. The basin is about 155 miles long, with an average width of 22 miles.

The terrain of the Big Black River Basin consists primarily of upland or hill area except for some rolling prairie in Madison County and the alluvial area of the Mississippi River flood plain. The upper reaches of the basin have ridges with elevations above 600 feet, NGVD, and are dissected by numerous streams. The topography is gently sloping to steep with some wide ridge tops. The lower reaches, known as the Loess or Bluff Hills have ridges that extend to an elevation of more than 300 feet, NGVD. This lower area is well dissected by deep gorges. The topography is rolling to very steep with certain sections along the perimeter being rugged, with the highest and most rugged terrain in the upper reaches of the eastern tributaries of the basin.

Bottomlands of the Big Black River Basin are nearly flat. The main valley elevations range from about 350 feet, NGVD, near Eupora, Mississippi to about 75 feet, NGVD, near the outlet into the Mississippi River. The main valley bottomlands make up about 10 percent of the total basin drainage area. Total land subject to overflow comprises about 21 percent of the basin drainage area. Flooding occurs more often in the winter and spring months of the year, although floods occur throughout the year.

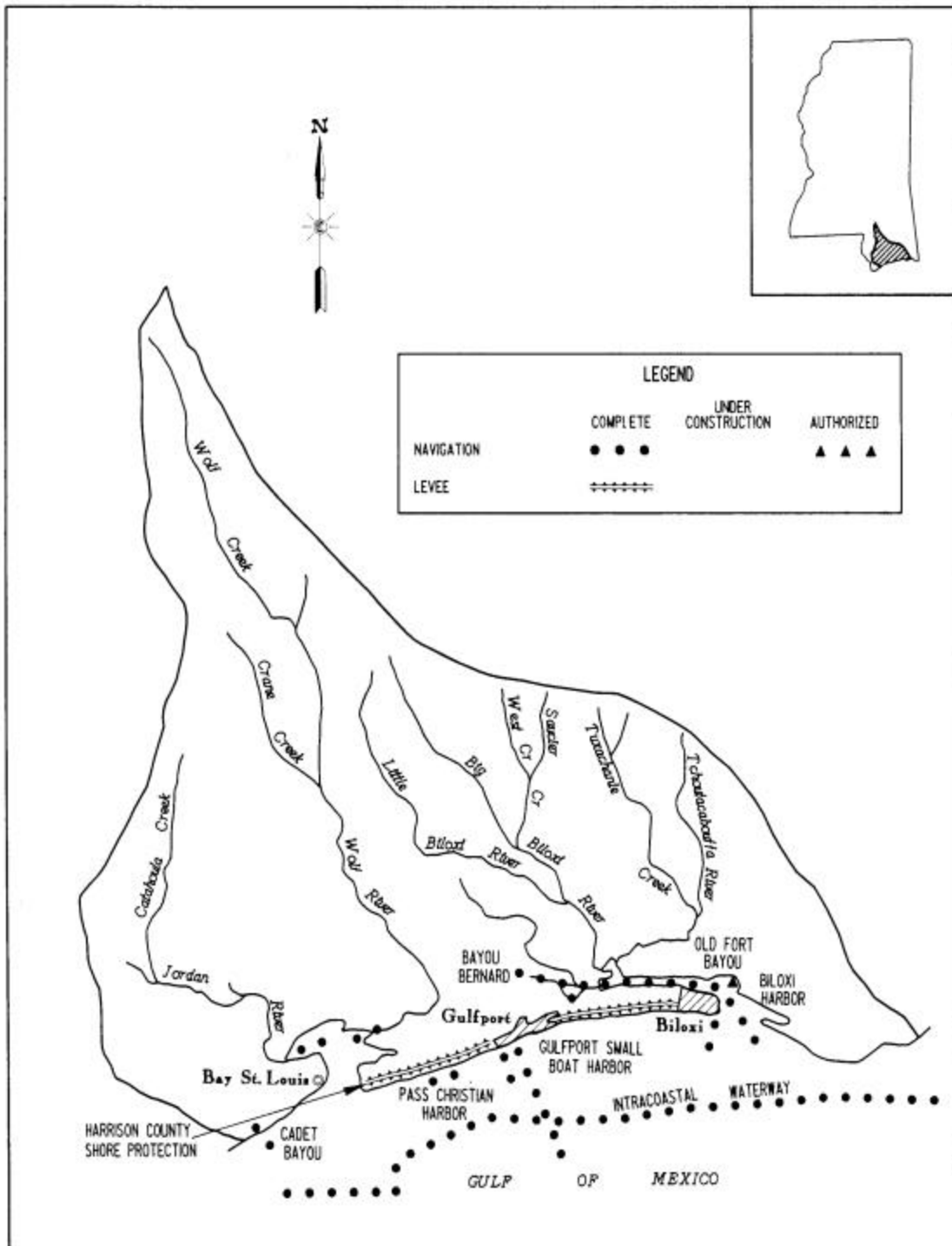
The economy of the basin is based primarily on agriculture, including timber production. Principal crops are cotton, corn, soybeans, small grains, pasture, and timber. Most industry in the area relates to agriculture and wood products. Earlier water resource development in the basin, performed in the 1930's and 1940's, is now ineffective in reducing flood damages. A comprehensive study was conducted in 1969 to examine various basin problems and needs, including water supply, flood control, and power. However, no water resource projects were recommended or authorized as a result of the comprehensive study.

Projects

Big Black River (Vicksburg District)

In 1938 and 1939, over 300 miles of the Big Black River were improved by constructing cutoffs and clearing and snagging channels. Also, channel clearing and snagging on 14 tributaries of the Big Black River were completed in 1941. This work resulted in lower stages and more rapid runoff of floodwaters for all reaches. However, these works of improvement were not maintained and currently are no longer effective in reducing flood damages. The project is now in an inactive status.

Gulf Coast Area



Gulf Coast Area

Mississippi's Gulf Coast area consists of the drainage basins of the coastal streams and their tributaries lying between the Pascagoula River Basin on the east the Pearl River Basin on the west with the Mississippi Sound on the south. The pie-shaped area covers about 1,530 square miles and consists of four major subbasins: the Tchoutacabouffa River with an area of about 242 square miles, the Biloxi River with about 271 square miles, the Wolf River with about 368 square miles, and the Jordan River with about 391 square miles. In addition, smaller streams drain the area near the coast. The area lies wholly within the Gulf Coastal Plain. The maximum width is about 54 miles, along the coast, and the length is about 50 miles. Elevations within the area range from 420 feet, NGVD, in Lamar County to sea level along the coast.

Projects

Biloxi Harbor ***(Mobile District)***

Biloxi, the first capitol of early French Louisiana, has been a leading fishing port for many years. Although the channels serve only shallow-draft shipping, the harbor is a busy one. The first federal project for Biloxi was adopted in 1882.

Authorization for the project provides the following:

- ❑ A continuous channel 12 feet deep, 150 feet wide, and 23 miles long from about Mile 88.0 on the Gulf Intracoastal Waterway east of Deer Island through Mississippi Sound. Biloxi Bay. Back Bay, and Big Lake, and a land cut to Gulfport Lake, including a 500- by 2,600-foot turning basin in the lake, thence a channel 12 feet deep, 100 feet wide, and about 2 miles long, westward from the western end of Gulfport Lake, terminating in a 300- by 500-foot turning basin.
- ❑ A 12- by 100-foot channel from the main channel in Big Lake up Bayou Bernard to the Air Force air terminal at about Mile 2.6.
- ❑ A 12- by 150-foot spur channel from the main channel in Biloxi Bay westward about 1 mile, terminating in a 400- by 600-foot turning basin opposite Ott Bayou.
- ❑ A 12- by 150-foot lateral channel westward about 2.2 miles from the main channel in Biloxi Bay to a point opposite Oak Street on the Biloxi south waterfront.
- ❑ A 10- by 150-foot channel, about 3.5 miles long, from the 10-foot depth in Mississippi Sound west of Deer Island to the south waterfront, where it joins the lateral channel.

Project modifications authorized in 1966 were completed in 1975. Cost modification as authorized by the 1966 River and Harbor Act was \$664,390. That portion of the project providing for an entrance channel 6 feet deep, 50 feet wide, and about 1,800 feet long into Old Fort Bayou, as authorized by the 1945 River and Harbor Act, is inactive. Estimated cost (1954) of this portion was \$6,000.

Further modifications to the project were authorized by the Chief of Engineers in 1979, which provided for a channel 10 feet deep, 100 feet wide and 300 feet long extending northward from the Biloxi Lateral Channel, and into a rectangular basin, approximately 300 by 300 feet, for use by commercial small craft, and an East Harrison County Canal project which provides for a 12-foot project depth, 130-feet wide and about 2,100 feet long, and a 300- by 300-foot turning basin also to a 12-foot depth project. This work was completed in 1980.

Since the project was first adopted, construction expenditures at Biloxi Harbor have amounted to just over \$1.5 million, and \$102,600 in contributed funds. Maintenance costs for the harbor have amounted to approximately \$16,830,180 and \$238,640 in contributed funds. The maintenance work includes dredging and snagging accomplished in 1969 to restore channels damaged by Hurricane Camille, as well as normal annual maintenance.

In the last 3 years, an average annual tonnage of 1.7 million has moved in the harbor. About 2,521,000 tons of commodities, consisting mostly of coal and lignite petroleum and coal products, jet fuel, and fresh fish were moved in 1997. Navigation channel improvements on Bayou Bernard are part of the Biloxi Harbor project.

In 1945, congressional authorization provided for the construction of an entrance channel 6 feet deep and 50 feet wide from Back Bay of Biloxi into Old Fort Bayou. In May 1969, the Senate Public Works Committee authorized a survey to consider a channel 12 feet deep from Back Bay to Mile 9.5 in the bayou. A report completed in 1979 indicated that none of the plans investigated to provide navigational improvements were economically justified. Accordingly, the report recommended that no federal action be taken.

A project to improve the commercial docking facilities at Biloxi was completed under authority of Section 107 in April 1980. Total cost of this work amounted to about \$270,000.

Under authority of Section 107 of the Rivers and Harbors Act of 1960, a navigation access channel to serve the East Harrison County Industrial Park was constructed. The project provided for a 12 by 130 foot channel, 2,100 feet long with a 300- by 300-foot turning basin at the southern end. The project was completed in 1986.

Cadet Bayou ***(Mobile District)***

Cadet Bayou, also known as Bayou Caddy, is a small tidal stream in southwest Hancock County that is used by commercial fishermen and recreational boaters. An entrance channel was dredged through the shoals at the mouth of the bayou in 1966 following Hurricane Betsy and in 1969 following Hurricane Camille.

In 1969, the Chief of Engineers authorized improvement of Cadet Bayou. The project consists of a channel 8 feet deep, 100 feet wide and about 1.5 miles long from the 8-foot depth in Mississippi Sound to the mouth of the bayou; 8 feet deep and 80 feet wide from the mouth to a turning basin about 700 feet upstream; and thence 6 feet deep and 60 feet wide to a point about 2 miles above the mouth. The turning basin at the head of the 8-foot channel is 6 feet deep, 140 feet wide, including the channel, and 130 feet long. Another turning basin 170 feet wide, including the channel, and 100 feet long is located 870 feet downstream from the end of the improvement. Overall length of the channel including the turning basins is about 3.5 miles. The channels and turning basins were completed in 1970. Maintenance costs have amounted to \$1,461,915. The channels are used primarily for the movement of seafood and fish products.

Gulf Intracoastal Waterway ***(Mobile District)***

The Gulf Intracoastal Waterway, which extends from the vicinity of Apalachee Bay, Florida, to Brownsville, Texas, provides a protected channel 12 feet deep and 150 feet wide along the entire coastline of the state of Mississippi. Tremendous traffic demands during World War II resulted in an authorization in 1942 to enlarge the channel to its present dimensions. This work was completed in 1943. The waterway links the Mississippi Coast with all other ports along the Gulf of Mexico and with all inland waterway systems emptying into the Gulf from Florida to Mexico.

Traffic over the Mobile to New Orleans section of the waterway remains significant. During 1997, 47,331,000 tons were moved over the route giving an average annual tonnage of 48.7 million during the past 3 years.

The cost of constructing and maintaining the portion of the channel along the Mississippi Coast has been small since most of the natural channel is deeper than project dimensions.

Gulfport Harbor ***(Mobile District)***

Commerce at the Port of Gulfport is principally foreign, with the major commodities being bananas and plantains, nonferrous ores, animal feeds, grain mill products and sugar.

The project was first adopted in 1899 and has been modified a number of times to enlarge the channels. The present project provides for: (a) a channel 32 feet deep, 300 feet wide, and about 8 miles long across Ship Island Bar; a channel 30 feet deep, 220 feet wide and about 11 miles long through Mississippi Sound; and an anchorage basin at Gulfport that is 30 feet deep, 1,320 feet wide and 2,640 feet long; and (b) maintenance of the existing commercial small boat harbor about 26 acres in area; and a straight approach channel, 100 feet wide and about 4,300 feet long, from deep water in Mississippi Sound to a small boat basin, all at a depth of 8 feet. Under ordinary conditions, mean tidal range is about 1.75 feet, and extreme range, except during storms, is about 3.5 feet. Plane of reference is mean low water.

The project is authorized in the Water Resources Development Act (WRDA) of 1986, and further amended by WRDA of 1988 to modify the existing ship channel to 36 by 220 feet in Mississippi Sound and 38 by 400 feet across the bar, with changes in the channel alignment and the entrance to the anchorage basin for safe and unrestricted navigation. The 1991 construction appropriation provided for constructing an increment of the authorized project and provide a 36- by 220-foot channel in Mississippi Sound and a 38- by 300-foot channel across the bar. See additional information under "Studies."

Federal cost of new work at Gulfport Harbor has amounted to \$24,176,000 and maintenance costs have amounted to approximately \$55,645,136. During the last 3 years, traffic in the harbor has averaged 2,109,000 tons. A total of 2,448,000 tons of cargo moved through the port in 1997.

Harrison County Shore Protection ***(Mobile District)***

This project was completed in 1953 and provided for federal participation in the repair of the Harrison County Seawall and its protection by constructing a sand beach from Biloxi Lighthouse to Henderson Point west of Pass Christian, a distance of 24 miles. The beach has an overall width of 300 feet and a height of 5 feet above NGVD at the seawall.

Lorraine Road ***(Mobile District)***

A project to correct stream bank erosion on Biloxi River adjacent to Lorraine Road, Harrison County, was authorized under Section 14 of the Flood Control Act of 1946, as amended. The project provides protection in two areas where stream bank erosion was threatening to undermine or erode Lorraine Road. The project includes the use of stone revetment and the placement of fill and vegetative cover. Construction was initiated in August 1983 and completed in October 1983.

Pass Christian Harbor ***(Mobile District)***

Pass Christian has a small-craft harbor, constructed by local interests, which is used primarily as a base for commercial shrimp and oyster vessels and for recreational craft. The small-craft harbor is about 1,000 feet long along the shore and 700 feet wide, and the short entrance channel is 100 feet wide. Project authorization provided for improvement and maintenance of the harbor and its entrance channel to a depth of 7 feet within the existing bulkheads and breakwaters. This work was completed to project dimensions in 1959. Total maintenance costs for the project have amounted to approximately \$823,385. A total of 1,450 tons of cargo was reported in 1989, principally perishable goods and miscellaneous transportation equipment. No commerce was reported in 1995.

Tchoutacabouffa River ***(Mobile District)***

Clearing and snagging in the lower reaches of Tchoutacabouffa River was accomplished in 1967 to improve navigation.

Wolf and Jordan Rivers ***(Mobile District)***

This project provides for dredging channels at the mouths of these streams, 7 feet deep at mean low water and 100 feet wide, extending from the 6-foot contour in St. Louis Bay to the 7-foot contour in each stream. The project was completed in 1908. Maintenance of the federal project in Wolf River is being withheld pending development of adequate commerce. These channels are used almost exclusively for shipment of pulpwood and marine shells. A total of 10,000 tons were moved in 1989. No commerce was reported in 1997. Approximately \$481,515 has been spent for maintenance, including channel restoration following Hurricane Camille in 1969.

Studies

Gulfport Harbor ***(Mobile District)***

The Committee on Public Works of the U.S. Senate adopted a resolution on September 23, 1965, that directed the initiation of studies to determine the advisability of modifying Gulfport Harbor. Further, Section 304 of the Rivers and Harbors Act of October 1965 authorized and directed the Secretary of the Army to begin survey scope studies. The Chief of Engineers determined a combined report would be prepared to meet both requirements. The Survey Report was completed in November 1976. In May 1977, the Report was approved by the Board of Engineers for Rivers and Harbors. In 1978, the

Secretary of the Army transmitted the report to Congress, with a recommendation to conduct Phase I Advanced Engineering and Design.

The plan recommended in the Survey Report for improvement of Gulfport Harbor consists of enlarging the existing entrance channel to provide a depth of 38 feet and width of 400 feet from the 38-foot depth contour in the Gulf of Mexico for a distance of about 9.1 miles to a point in Mississippi Sound near the western end of Ship Island; enlarging the channel through Mississippi Sound to a depth of 36 feet and a width of 300 feet for a distance of about 11.8 miles between the inner end of the gulf entrance channel and the anchorage basin at Gulfport; realigning the ship channel through Ship Island Pass to a location generally parallel to and about 1,000 feet west of the existing channel, with a deposition basin for littoral drift 38 feet deep, 300 feet wide, and 2,000 feet long, adjacent to the east side of the channel at the west end of Ship Island; and enlarging and adjusting the dimensions of the anchorage basin and channel entrance by extending the southern limits of the basin southward about 1,180 feet along the west pier and 2,300 feet along the west side of the ship channel, decreasing the width of the anchorage basin from 1,320 feet, as now exists, to 1,120 feet, and deepening the basin and the adjusted channel approach to 36 feet.

As directed by the Water Resources Development Act of 1986, material disposal will be in the Gulf of Mexico. The Water Resources Development Act of 1988 modified the WRDA of 1986 and authorized disposal of dredged material in open water of the Gulf of Mexico and by thin layer disposal in Mississippi Sound under a demonstration program. The General Design Memorandum was approved in 1989.

The channel contract awarded in 1992 was completed in 1994. The thin-layer monitoring program is continuing.

Hancock, Harrison, and Jackson Counties ***(Mobile District)***

A reconnaissance level study was initiated in January 1994 to identify potential alternatives including flood damage reduction measures, commercial navigation and restoration and protection of environmental resources.

The study area is approximately 2,600 square miles in size and includes the drainage areas in the coastal Mississippi counties of Hancock, Harrison and Jackson. Major streams in the area include the Pearl, Jordan, Wolf, Tchoutacabouffa, Biloxi, Escatawpa and Pascagoula rivers. The principal water resources problems to be investigated by this study consist of flooding, commercial navigation and environmental restoration and protection in all three counties. The population of the study area is increasing at approximately twice the rate for the state, and increased urbanization has accentuated the flooding problems in the area.

Significant floods resulting in Presidential Disaster Declarations occurred in January and April 1983, August 1987, and January and May 1991, along the Biloxi, Wolf, and

Tchoutacabouffa Rivers. During the past 11 years, flood damages to residential and commercial properties have totaled \$14 million, the most significant being \$2.3 million in 1983, \$1.2 million in 1987, and \$4.7 million in 1991. Continued growth and relatively frequent flooding in the area warrant investigation and resolution of the flood problems as early as possible. All of the counties have indicated a willingness to cost share in the feasibility study.

Mississippi Gulf Coastal Area Urban Study ***(Mobile District)***

A Senate resolution adopted in January 1973 authorized a survey under the urban studies program to consider water-related needs in the Gulf Coastal Area comprised of Jackson, Harrison, and Hancock Counties. A study was initiated in 1984, and a reconnaissance report was completed in 1985. The Hancock County Board of Supervisors, which provided local funding for the cost-shared study, voted in 1989 to discontinue their participation in the study.

No Corps of Engineers report was written on the discontinued study. Technical data produced in the course of the study were furnished to the county engineer for use in planning a nonfederal project. The results of the study were briefly in our report on the Escatawpa River, Mississippi Study, which was authorized under the same congressional resolution.

Mississippi Sound and Adjacent Areas ***(Mobile District)***

A congressionally directed survey study to investigate dredged material disposal problems in Mississippi Sound on a regional basis was authorized in 1977 and initiated in 1978. The area includes the major deep-draft channels of Mobile, Pascagoula, Biloxi, and Gulfport Harbors as well as numerous small-craft channels. Completed in September 1984, the report made a number of recommendations to provide for improvements in environmental quality and economic efficiency in the planning, construction, management, and maintenance of federal coastal navigation projects.

Ocean Springs Harbor ***(Mobile District)***

A survey study on Ocean Springs Harbor for channel modifications to accommodate present and future vessel traffic was authorized by Section 107 of the Rivers and Harbors Act of 1960.

The study area is located in Jackson County on Biloxi Bay about 10 miles west of Pascagoula, Mississippi. The channel extends from the lateral channel at Biloxi's south

waterfront intersection with the main Biloxi Bay channel north of Deer Island at channel Marker Number 26. Feasibility phase studies were completed in 1998.

Wolf and Jordan Rivers and Bayou Portage Harbor
(Mobile District)

A survey study on Wolf and Jordan Rivers and Bayou Portage Harbor, Pass Christian, Mississippi, was initiated in 1982 to determine the feasibility of modification and maintenance of the locally provided channel which extends from the Wolf River channel in St. Louis Bay to the end of a dead-end canal in Bayou Portage Harbor. The Feasibility Report, completed in 1985 and approved by the Board of Engineers for Rivers and Harbors in 1986, recommends the provision of a channel, 8 feet deep by 100 feet wide and about 4.5 miles long from the 8-foot depth contour in St. Louis Bay, following the existing channel alignment, and terminating at the end of the canal in Bayou Portage Harbor. The project would also provide a turning basin 8 feet deep, 200 feet wide, and 800 feet long. The final report of the Chief of Engineers was signed in 1987, endorsed by Assistant Secretary of the Army for Civil Works in 1987, and submitted to the Office of Management and Budget. The project was authorized for construction in the Water Resources Development Act of 1988 (P.L. 100-1098). Pre-construction engineering and design was initiated in 1997 and was completed in 1998.

Flood Plain Management

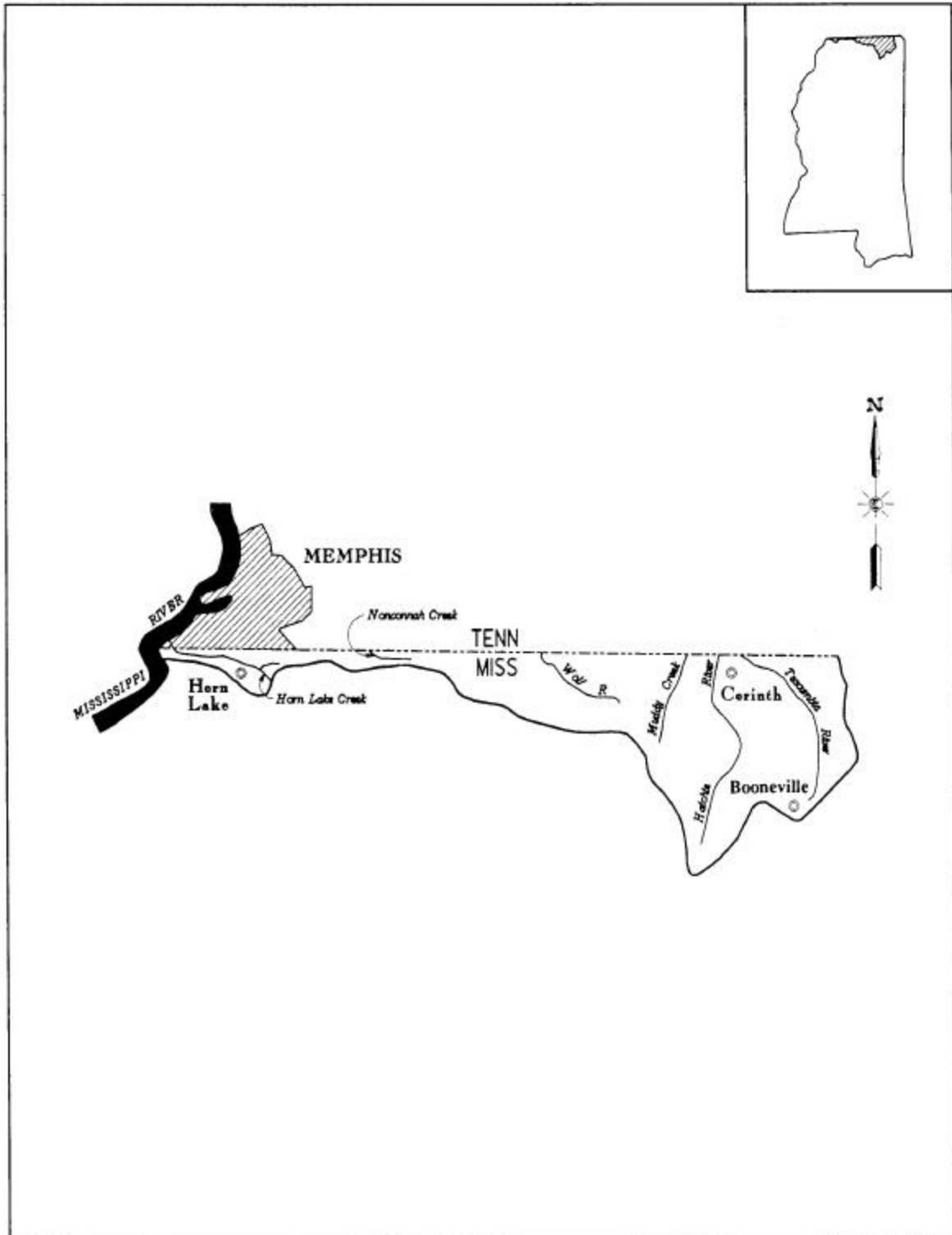
Biloxi River
(Mobile District)

Residential and rural agricultural lands along Biloxi River. Report published in 1977.

Old Fort Bayou at Ocean Springs
(Mobile District)

Residential lands near Old Fort Bayou at Ocean Springs. Report published in 1970.

Hatchie and Chickasaw River Basins



Hatchie and Chickasaw River Basins

The southern portions of the Hatchie and Chickasaw River Basins are located in the extreme northern portion of Mississippi, in parts of DeSoto, Marshall, Benton, Tippah, Alcorn, and Prentiss counties. The main streams in the Hatchie River Basin are the Hatchie River and its principal tributaries, the Tuscumbia River and Muddy Creek.

Hatchie River begins in the northwest corner of Prentiss County, Mississippi, and flows north into Tennessee, thence north and west to its confluence with the Mississippi River. The Tuscumbia River begins near Corinth, Mississippi, and joins the Hatchie River just north of the Mississippi-Tennessee state line. Muddy Creek begins in Tippah County, Mississippi, and flows northward to join the Hatchie River just north of the mouth of the Tuscumbia River.

The Chickasaw Basin, located west and below the Hatchie River Basin, consists of the combined drainage areas of the Loosahatchie and Wolf Rivers, Nonconnah Creek, and Horn Lake Creek. Wolf River begins in the northern part of Benton County, Mississippi. The streams flow in narrow flood plains through hill lands and generally flow in a westerly direction.

Projects

Hatchie River ***(Memphis District)***

The Hatchie River Study was authorized by Section 208 of the 1954 Flood Control Act, as amended. The project is located in Alcorn County, 15 miles southwest of Corinth.

In the late 1980s, a large logjam formed in the Hatchie River and caused large amounts of sand and silt to accumulate in a 3-mile long reach. The Hatchie River Drainage District removed the logjam but did not remove the sand and silt accumulated in anticipation that the river flow through the area would remove this material. This accumulation is such that the channel bottom has been raised approximately seven feet. Consequently, during rains as light as one-inch, the channel will overflow its banks and flood the local bottomland. The water depth of the channel at this site seldom exceeds approximately one foot during base flow conditions. At this depth, the river cannot naturally remove the huge amount of material that has accumulated. The flooding caused by the buildup of sediment is killing or has killed a large percentage of the natural hardwood forest that surrounds the river. In addition, land previously used as farmland has been abandoned due to the frequent flooding. The flooded lands have historically proven to be very valuable for quickly producing hardwood crops as well as being excellent farmland. Much of the wildlife such as deer and turkey that inhabit the area has left the sites that continue to be flooded. When flooding occurs, approximately 3,000 acres of land are adversely affected.

In 1992, the Hatchie River Drainage District requested the Memphis District assist in cleaning out the river. This project would have positive effects on the environment by restoring capacity of the river and the natural drainage of adjacent bottomlands.

Horn Lake Creek, Including Cow Pen Creek ***(Memphis District)***

Congressional authorization in 1976 provided for the initiation of advanced planning of improvements for flood control and allied purposes on Horn Lake Creek and tributaries, including Cow Pen Creek, as an independent feature of Nonconnah Creek, Tennessee and Mississippi, project. Horn Lake Creek Basin is located in extreme northwest Mississippi and southwest Tennessee. The major portion is located in DeSoto County, Mississippi, with a small portion of the lower basin extending into Shelby County, Tennessee. Located within the Horn Lake Creek Basin are the urban centers of Southaven and Horn Lake, Mississippi. Cow Pen Creek is a major tributary of Horn Lake Creek.

In 1984, the report on Horn Lake Creek and tributaries, including Cow Pen Creek, Tennessee and Mississippi, was submitted to congress for authorization of the project. The report was printed as House Document 98-195. The Water Resources Development Act of 1986 authorized the construction of improvements for flood control on Horn Lake Creek and tributaries, including Cow Pen Creek.

A General Design Memorandum was approved in December 1990. The GDM plan of improvement consists of 3.5 miles of drift removal on lower Horn Lake Creek and 2.8 miles of channel clearing on Horn Lake Creek, 2.1 miles of vegetative clearing on Rocky Creek, and 0.6 miles of vegetative clearing and 1.8 miles of channel enlargement on Cow Pen Creek. Hiking and biking trails are included along Rocky Creek and Cow Pen Creek.

The Horn Lake Creek project received New Start construction funding in 1991. A local cooperation agreement was signed in February 1993. Construction was initiated in 1993 and was completed in 1998.

Turner Creek, Corinth, Mississippi ***(Memphis District)***

The project is located in north-central Mississippi in Alcorn County on the left and right banks of Turner Creek immediately downstream of Highway 45B in Corinth, Mississippi.

Authorized under the authority of Section 14 of the Flood Control Act of 1946, the project consists of a timber retaining wall along 73 feet of the right bank to control erosion which was threatening a city-owned community theater building and a 121-foot long left bank wall to protect a privately owned service station which might have been compromised due to deflection of flow from placement of the right bank wall.

Construction was completed in 1987, at a total cost of \$95,243.

STUDIES

Memphis Metro Area, **Tennessee and Mississippi** ***(Memphis District)***

A reconnaissance study was made in the Memphis Metro Area to determine flood control, urban drainage, storm water management, water quality, environmental restoration/protection, and other water resources problems, and to develop plans to meet the needs of the area. The study area includes Fayette, Shelby, and Tipton Counties in Tennessee, and DeSoto and Marshall Counties in Mississippi. The area encompasses approximately 2,600 square miles and includes all or part of six major drainage basins: Hatchie River, Loosahatchie River, Wolf River, Nonconnah Creek, Horn Lake Creek, and Coldwater River. The study was authorized by a resolution passed by the U.S. House Committee on Transportation and infrastructure in 7 March 1996.

The reconnaissance report was completed in March 1999 and submitted without a Project Study Plan. In March 2000, the City of Germantown, TN, and the Horn Lake Creek Drainage District provided letters-of-intent indicating their willingness to serve as the local sponsor for the feasibility level studies within their respective areas. The Germantown project will require special congressional authorization to overcome current Corps policy requirements for a drainage project, minimum drainage area of 1.5 square mile and 10-year discharge of 800 cfs. The Horn Lake Creek Drainage District will be co-sponsoring with the cities of Southaven and Horn Lake. The Memphis District is working with the Horn Lake Creek Drainage District to develop a scope of work. Once an acceptable scope of work and associated cost for feasibility studies are developed as part of the study plan and a Feasibility Cost Sharing Agreement is executed, the documents will be submitted as part of the reconnaissance report certification process. It is anticipated that the Project Study Plan will be completed in November 2000. FY 2001 funds in the amount of \$657,000 are available to initiate feasibility studies. Final feasibility study costs are dependent on the scopes of work and whether other potential sponsors decide to pursue projects.

Newport Harbor, Mississippi ***(Memphis District)***

A special investigation was made of the potential for a harbor on the Mississippi River in the vicinity of Newport in DeSoto County in the northwest corner of Mississippi. The area includes potential sites for both fastwater and slackwater harbors. The special investigation was in response to language included in H.R. 101-536 which accompanied the Energy and Water Development Appropriations Bill of 1991.

The special investigation was completed and a draft report was submitted in 1992. The investigation assessed the port and associated infrastructure development needs, costs,

benefits, schedules and alternative recommendations regarding federal and non-federal financing.

Three sites were considered for potential harbors. They included fastwater facilities at river miles 705 and 707.7 and a slackwater facility at river mile 710.7. An industrial park was planned adjacent to the harbor facilities.

It was determined that there is a need and economic justification for a navigation harbor project, independent of an industrial park. There are no general navigation costs associated with the construction of port facilities at sites 1 or 2. Under current policy, federal participation in the construction of inland navigation projects is limited to general navigation features. However, current policy also would normally require that the NED plan be the selected plan. In the draft report, site 1 was identified as the NED plan. Since there is no general navigation cost associated with site 1, there appears to be no federal interest in the project under current policy.

Nonconnah Creek ***(Memphis District)***

Channel construction contract for Item 1 was awarded in April 2000. Item 1 includes channel clearing in the lower 2 miles, bendway protection, and a stabilization weir near the mouth. Construction for this item is scheduled for completion in April 2001. Plans and specifications for Item 2, channel improvements Mile 2 to 18.2, will be completed in FY02, with construction scheduled to begin in FY03.

The City of Memphis submitted a letter of intent on 19 September 2000 to serve as local sponsor for the authorized, separable environmental and recreational components of the project. A local cost sharing agreement will be executed with the City upon appropriation of Federal funding.

Shelby County, Tennessee, Mayor Jim Rout, is seeking legislation to authorize extension of the flood control portion of the project approximately five miles and to extend the hike/bike trails from 8.8 miles to 27 miles.

Tunica Cutoff Lake Study Tunica County, Mississippi **And Lee County, Arkansas (Mississippi River)** ***(Memphis District)***

The Tunica Cutoff Study was authorized by Section 1135(b) of the Water Resources Development Act of 1986, as amended by Section 304 of the 1990 Water Resources Development Act. The project is located in Tunica, County, Mississippi, and Lee County, Arkansas, 26 miles south of Memphis, Tennessee; riverward of the left bank mainline Mississippi River Project levee at Mississippi River Mile 677.5.

Tunica Cutoff Lake was created by the Corps of Engineers in 1942 as part of the Mississippi River Channel Improvement Project feature of channel realignment via cutoffs for navigation and flood control. A small chute connects the downstream end of

the lake with the Mississippi River during intermediate stages. Over the years this chute has been degrading. As a result, minimum lake levels closely follow the Mississippi River stages. In the summer of 1988, the lake surface area was about 70 percent smaller than normal. These lower minimum water levels have resulted in significant detrimental effect on fish and waterfowl habitat as well as recreational opportunities.

The study purpose is to determine if an environment restoration project is feasible. The project desired by the local sponsor and most other interested parties consists of maintaining a minimum water level in the lake via a stone weir constructed across the outlet/inlet chute. The benefits, which would result from the proposal, would be a significant restoration of the lake fish and waterfowl habitat. A request for the study was made by Tunica County in May 1991 and was approved for study by the Assistant Secretary of the Army for Civil Works in October 1991.

Preliminary study findings were provided to the U.S. Fish and Wildlife Service (USFWS), Mississippi Department of Wildlife Fisheries and Parks (MDWFP), and the Arkansas Game and Fish Commission (AGFC) in 1992. In a September 1993 meeting, representatives from each of the three agencies expressed support for a modified weir design. However, in a letter dated October 1993, the USFWS recommended that the Tunica Cutoff Lake Weir study be held in abeyance until an Environmental Impact Statement regarding impacts of casino development to fish and wildlife habitat is completed. In August 1996 The Memphis District drafted a Project Modification Report based on a weir configuration acceptable to MDWFP. Due to lack of benefits associated with this weir configuration a Federal interest in the project was not identified. Subsequently, WRDA 1999 authorized inclusion of recreational benefits in the project analyses. Also, during the low river stages on the Mississippi River during January 2000, additional degradation of the channel outlet occurred. Following the degradation that occurred in January 2000, a multi-agency review of the 1996 weir design was undertaken and an alternate weir design that maximizes environmental benefits yet maintains historical access to the lake from the Mississippi River was developed. Preliminary analyses indicate this alternate design will result in a Federal interest in a project. Completion of the feasibility level study is scheduled for December 2000.

Tuscumbia River Basin Study, Alcorn and Prentiss Counties, Mississippi *(Memphis District)*

The Tuscumbia River Study was authorized by the Committee on Public Works and Transportation of the House of Representatives in 1984. The authorization directed the investigation be conducted jointly by the U.S. Army Corps of Engineers and the U.S. Soil Conservation Service (SCS). The Tuscumbia River Watershed includes approximately 520 square miles in the upper reaches of the Hatchie River Basin. The watershed includes portions of Alcorn and Prentiss counties in northeast Mississippi and extends into McNairy County in south-central Tennessee.

Water resource problems in the Tuscumbia River Basin, including flood control, water supply and other related problems, were investigated during the reconnaissance study phase. The Tuscumbia River Reconnaissance Report was completed in 1987. The report recommended implementation of a channel restoration project on the lower 7.4 miles of the Tuscumbia River in Mississippi and Tennessee under Section 205 of the Continuing Authorities Program; no further study of water supply alternatives for Corinth, Mississippi, because of no federal interest; advanced studies of flooding problems along Elam Creek in Corinth under Continuing Authorities Program; construction of an authorized SCS reservoir to control flooding on Phillips Creek in Corinth; and no further study of flooding problems in Booneville, Mississippi. Memphis District was unable to obtain a water quality certification for restoration of the portion of the Tuscumbia River in Tennessee and SCS and the Tombigbee River Valley Water Management have assumed primary responsibility for the proposed project.

Wolf and Loosahatchie Rivers,
Tennessee and Mississippi
(Memphis District)

Based on study findings of no federal interest in the project due to economically unfeasible, the study was classified inactive in 1983.

Flood Plain Management

Booneville
(Memphis District)

Vicinity of Booneville in headwater area of Tuscumbia River. Other streams include Kings Creek, Mile Branch, and their tributaries. The area affected included agricultural land and some residential and commercial areas. Report published in 1976.

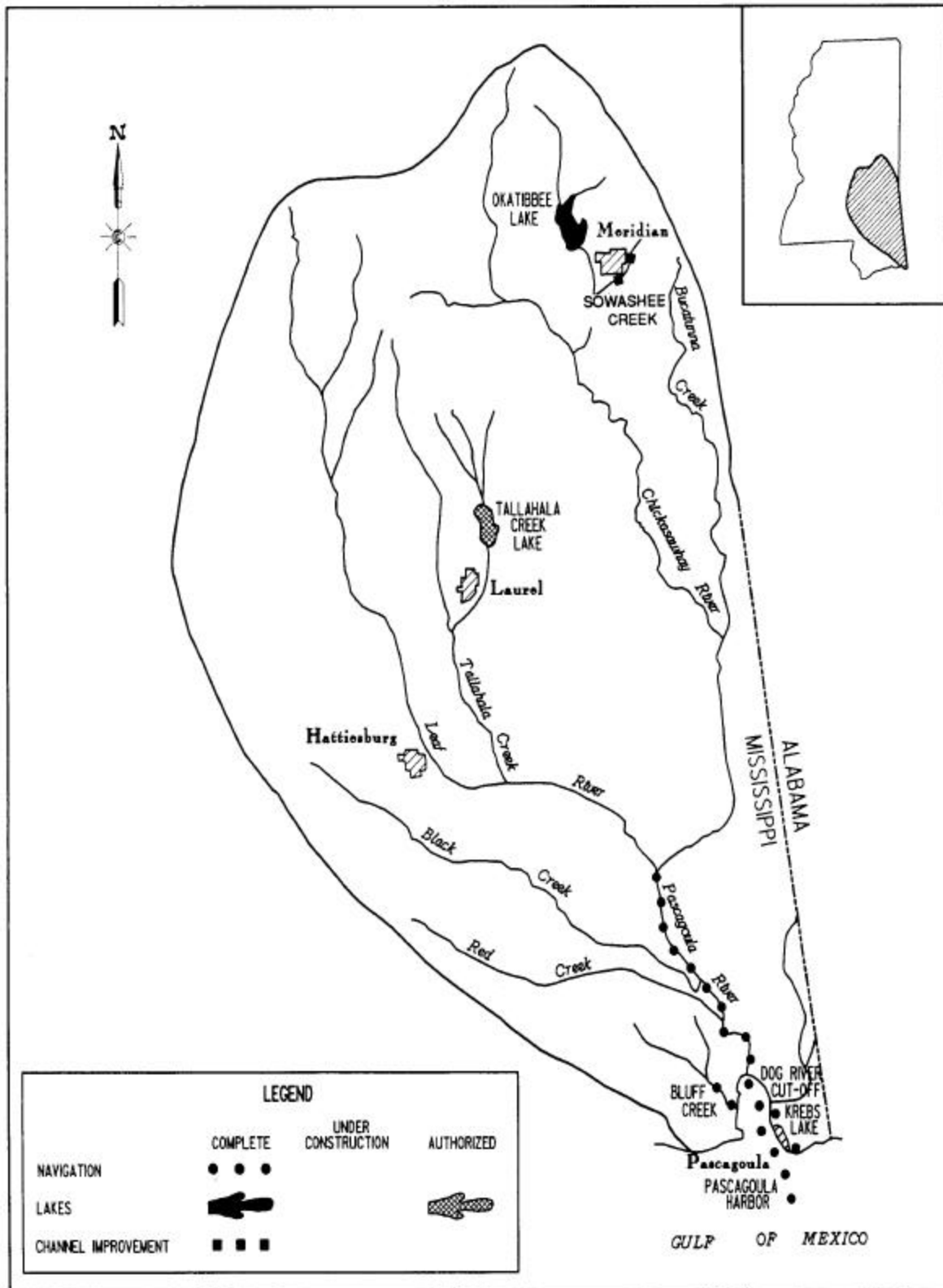
Corinth
(Memphis District)

Vicinity of Corinth, Mississippi. Streams included in study included Bridge, Elam, Phillips, and Turner Creeks, all within the Hatchie River Basin. Report published in 1972.

Horn Lake
(Memphis District)

Vicinity of Horn Lake, DeSoto County, Mississippi. Information on flooding from Horn Lake Creek and tributaries, including Cow Pen Creek. Report published in 1972.

Pascagoula River Basin



Pascagoula River Basin

The Pascagoula River Basin comprises a major part of southeastern Mississippi and a small part of southwestern Alabama. Roughly oval in shape, it has a maximum length of 164 miles and a maximum width of 84 miles. The basin has an area of about 9,700 square miles, 8,940 square miles of which are in Mississippi.

The Pascagoula River is formed by the confluence of the Leaf and Chickasawhay Rivers near Merrell in George County, Mississippi. Each of these headwater streams is about 160 miles long and has important tributaries of its own. The Pascagoula flows south 81 miles to enter Mississippi Sound. About 37 miles above its mouth, it is joined by Red and Black Creeks to form Dead Lake. About 7 miles above its mouth, it is joined by the Escatawpa River, which rises in Alabama and flows southwestward to enter Mississippi west of Lucedale.

The basin lies entirely within the Gulf Coastal Plain. Topography is rugged in the northeast corner of the basin but gently rolling to flat in the remainder of the area. Elevations range from 700 feet, NGVD, to sea level along the coast.

Runoff in the basin varies widely during the year, being high in the winter and spring months and low in the late summer and early fall. The economy of the basin has shifted its basis from agriculture to diversified manufacturing and other nonagricultural activities. The principal towns are Meridian, Hattiesburg, Pascagoula, and Laurel.

Projects

Bluff Creek

(Mobile District)

This project provides for the removal of snags, logs, and overhanging trees along Bluff Creek (tributary of Pascagoula River) to maintain a navigable channel from the mouth 10 miles upstream to Vancleave. The work was completed in 1892. The average annual tonnage moved on the creek during the period 1953-1962 was 4,260 tons, but no movement has been reported since 1962, except 1,000 tons of oyster shells barged upstream in 1967.

Gordon's Creek

(Mobile District)

A study considering channel improvement for flood control on Gordon's Creek at Hattiesburg, Mississippi, was completed in August 1976. The report recommends channel excavation and clearing and snagging in the lower reaches of the creek for a total length of 2.35 miles. Construction was initiated in late 1978 and completed in January 1980 at a total cost of about \$802,026, including study costs.

Hintonville Road Bridge ***(Mobile District)***

The project is located approximately 1 mile east of Hintonville along an unnumbered county road. The Thompson Creek drainage area is located in southeast Mississippi and is part of the Pascagoula River Basin.

The project authorized by Section 14 of the Flood Control Act of 1946, as amended, provides protection for the bridge side slopes and channel bottom, and to realign the channel through the center span of the bridge. Bank protection was provided from 350 feet upstream of bridge to 200 feet downstream. A 40-foot bottom width channel was excavated and riprapped through the center span of the bridge. A stone training dike was constructed on the left bank of the project channel to direct low flows through the project channel and away from the left bank and left bridge abutment. The dike was protected with 12 inches of riprap and 6 inches of bedding material and filter fabric.

Construction contract was awarded in 1989 and completed in 1991. Total construction cost was \$345,152.

Leaf and Bowie Rivers ***(Mobile District)***

The study of flooding by the Leaf and Bowie Rivers at Hattiesburg and Petal, as well as the unincorporated communities of Glendale and Harvey, was authorized as one part of the overall study of flood control in the Pascagoula River Basin by a Senate Public Works Committee resolution adopted in June 1974. As all economically feasible plans could be implemented within the federal cost limitation of the Continuing Authorities Program, the local sponsoring agency requested that all further study be made under the authority of Section 205 of the 1948 Flood Control Act, as amended.

Both Hattiesburg and Petal have experienced severe flooding from both rivers many times in the past, resulting in significant economic losses, social disruption, and loss of life. The flood of April 1974 is the largest experienced to date in the Hattiesburg and Petal areas. The record stage of 34.03 feet, recorded at the U.S. Geological Survey gauge on the Highway 11 Bridge crossing of the Leaf River, was approximately equal to the 100-year Flood height. As a result of this flood, \$5.7 million of damage was incurred at Hattiesburg, with \$2.5 million of damage at Petal. Over 6,000 people required emergency evacuation. Numerous other floods have occurred in the study area. An April 1980 flood caused damage assessed at \$1.2 million. During the detailed project study, economic investigations determined the average annual equivalent flood damage to be \$1,128,500 in the standard project flood plains of the Leaf and Bowie Rivers at Hattiesburg and Petal. The report was completed in 1983.

The final recommended plan involved channel snagging and overbank clearing, removal of the existing Petal sewage lagoon, the installation of two additional stage gauges with

telemetry and one standard rainfall gauge in the Bowie River Basin. This plan reduced the average annual equivalent flood damage in the study area by \$694,300 or 61.5 percent. Structural features include snagging the river for 12,500 feet, overbank clearing of 214 acres within the flood plains, riprap protection of the Southern Railroad and River Avenue Bridge piers, and removal of the Petal sewage lagoon and several natural humps in the flood plain.

Nonstructural features consist of the installation of two river stage gauges and one rainfall gauge to augment existing facilities used in flood forecasting of peak stage and its timing.

The project was completed in 1987. Total cost of construction as of 1990 was \$1,585,000.

Leaf River Near Mahned ***(Mobile District)***

Work was completed in November 1979 under emergency authority to correct a problem of streambank erosion along the Leaf River. The cost of this work amounted to about \$231,618.

Mill Creek ***(Mobile District)***

Mill Creek is located in the vicinity of Sumrall, Mississippi, and Tributary 1 that runs through downtown Sumrall. The drainage area is located in south central Mississippi and is part of the Pascagoula River Basin. Mill Creek originates in central Lamar County and flows north to Martin Creek. Mill Creek drains primarily agricultural and forested lands. Its total drainage area at its confluence with Tributary 1 drains primarily urban lands. Its total drainage area is .37 square mile.

The recommended plan consisted of clearing and snagging a one-mile section of Mill Creek channel beginning 2,680 feet above its mouth with a 50-foot wide floodway on the left bank of Mill Creek between Center Avenue and station 79100 was cleared of all underbrush and trees less than four feet in diameter. The floodway would occasionally alternate to the right bank to allow clearing of deep bends. The clearing and snagging of the creek channel involved the clearing of all materials, trees, shrubs, and any underbrush within the creek banks.

The construction contract was awarded in August 1992 and completed in February 1993. Total cost of construction was \$157,340.

Okatibbee Lake ***(Mobile District)***

Construction of a dam and lake on Okatibbee Creek about 7 miles northwest of Meridian, Mississippi, was authorized for flood control, municipal water supply, water quality control, general recreation, and fish and wildlife conservation. Construction began in 1965 and was completed in 1968.

The dam consists of a compacted earthfill 6,500 feet long with a maximum height of 61 feet above the streambed. A concrete conduit with a gated intake near the center of the dam is used in releasing water from the lake, and an unpaved free overflow spillway located east of the dam protects it from being overtopped by floodwaters. The lake has a total storage capacity of 142,350 acre-feet. Of this total, a maximum of 59,490 acre-feet and a minimum of 46,540 acre-feet are allocated for flood control storage, a maximum of 34,350 and a minimum of 21,400 acre-feet are allocated for water supply and water quality control, and 7,760 acre-feet are allocated for sediment storage. When the lake is operated for maximum flood control storage, the water supply storage is reduced to a minimum, and 53,700 acre-feet of surcharge storage is available above the 100-year flood control pool. The lake at normal summer operating level, when recreation use is at its peak, has a length of about 6 miles and a surface area of about 3,800 acres.

As a part of the Corps of Engineers' water quality control program, an automatic monitoring station immediately below the dam constantly checks the water released from the lake as to the amount of dissolved oxygen, temperature, and degree of acidity or alkalinity so that any drop in the quality of the water can be detected immediately.

The project:

- (a) reduces flood damages on 26,000 acres of agricultural lands along the lower Okatibbee Creek and the upper Chickasawhay River, at Meridian and Stonewall;
- (b) makes available sufficient water to meet the growing municipal and industrial needs of the city of Meridian for the next 50 years;
- (c) maintains stream flow at a level sufficient to reduce pollution materially; and
- (d) creates an attractive lake with an irregular wooded shoreline for such recreational activities as boating, water skiing, swimming, fishing, picnicking, and camping.

The Corps of Engineers has provided an overlook, picnic grounds and a boat-launching ramp near the dam and manages areas for picnicking, swimming, boating, and primitive camping at a number of other convenient locations around the lake. The Pat Harrison Waterway District, an agency of the State of Mississippi, has leased a large area on the east shore of the lake for more elaborate recreational development. This agency has provided a marina, a motel, a class "A" camping area, a swimming beach, and picnic areas. Approximately 5,000 acres in the upper reaches of the reservoir area are licensed to the Mississippi Department of Wildlife Conservation for game management.

As local sponsor for the project, the Pat Harrison Waterway District is reimbursing the federal government for the portion of the investment allocated to water supply. The District is also obligated to protect downstream channels from encroachment and pay the annual operation, maintenance, and replacement costs allocated to water supply.

The 1999 costs for ordinary maintenance and recreational management amount to \$1,508,000. Recreation attendance at the reservoir during 1999 totaled 965 visits.

Construction began in June 1965 and was completed in 1968. Total federal cost of the existing project as of 1999, was \$9,739,528 for new work and \$26,441,309 for maintenance, a total of \$36,180,837.

Pascagoula Harbor ***(Mobile District)***

Pascagoula is Mississippi's fastest growing seaport. Industries in the area include a large oil refinery and a large shipbuilding plant, both of which have been expanded recently; a paper mill; a wood preserving plant; a veneer plant; a can-manufacturing plant; a clothing factory; a grain elevator; and several menhaden and scrap-fish processing plants.

Pascagoula Harbor is located along the lower 6.8 miles of Pascagoula River, the lower 6 miles of Dog (Escatawpa) River and on Bayou Casotte. Federal appropriations were made for work at Pascagoula as early as 1827.

The project provides for the following:

- ❑ An entrance channel 40 feet deep and 350 feet wide from Gulf of Mexico through Horn Island Pass, including an impounding area of littoral drift, 40 feet deep, 200 feet wide and about 1,500 feet long adjacent to the channel at the west end of Petit Bois Island.
- ❑ A channel 38 feet deep and 350 feet wide in Mississippi Sound and Pascagoula River to the railroad bridge at Pascagoula, including a turning basin 2,000 feet long and 950 feet wide (including channel area) on the west side of the river below the railroad bridge.
- ❑ A channel 38 feet deep and 225 feet wide from the ship channel in Mississippi Sound to the mouth of Bayou Casotte, thence 38 feet deep and 300 feet wide for about 1 mile to a turning basin 38 feet deep, 1,000 feet wide, and 1,750 feet long.
- ❑ A 22- by 150-foot channel up the Pascagoula River from the railroad bridge to the mouth of Dog River, thence up Dog River to Highway 63 Bridge.
- ❑ A 12- by 125-foot channel from the highway bridge, via Robertson and Bounds Lakes, to Mile 6 on Dog River.

- ❑ A 12- by 80-foot channel from deep water in the Pascagoula River into Krebs Lake to a turning basin at a distance of about 1,500 feet, thence a 10- by 60-foot channel along the south bank of the lake, a distance of 2,700 feet, to a second turning basin.

The combined length of all the channels in this project is about 31 miles.

Construction of the increased deep-draft channel dimensions, authorized in 1962, was completed in 1965. Construction of the Krebs Lake channel was accomplished in 1983 at a cost of \$339,000.

Maintenance costs for Pascagoula Harbor have amounted to approximately \$68,445,813, which includes channel restoration costs following Hurricane Camille in 1969 and \$3,377,104 in contributed funds.

Annual shipping in the harbor over the past 3 years has averaged 27 million tons. The total for 1995 was 25.7 million tons, with the principal commodities being crude petroleum, corn, soybean, and phosphate rock.

Navigation channel improvements on Bayou Casotte are part of the Pascagoula Harbor Project.

Pascagoula River ***(Mobile District)***

The existing federal project for this stream provides for maintenance of the channel above the mouth of Dog (Escatawpa) River by the removal of obstructions as required. The average annual tonnage on the river for the years 1952-1961 was 14,441 tons, mostly logs; however, since 1961, few movements have been reported. No commerce was reported for 1995. Total maintenance costs for this stream amount to about \$179,500.

Sowashee Creek ***(Mobile District)***

In 1952, funds were allocated for the protection of low-lying areas of the city of Meridian, Mississippi, along Sowashee Creek by channel clearing, snagging and rectification. The project was completed in 1955. Under new authority provided in 1976, the Corps undertook to continue planning and engineering studies on Sowashee Creek in the Meridian urban area as a part of an authorized Soil Conservation Service watershed project.

The Water Resources Development Act of 1986 (P.L. 99-662) authorized a plan of improvement (3.9 miles), and clearing and snagging (6.6 miles) over a reach of 10.5 miles. One railroad bridge and several highway roads and bridges and utilities required modification for the channel improvement.

A Local Cooperation Agreement with the Pat Harrison Waterway District was completed on 23 September 1987.

Total federal cost under existing project to September 1998 was \$15,896,581 for new work. Contributed funds expended total \$1,218,036.

Tallahala Creek Dam ***(Mobile District)***

Construction was authorized in 1968 for a dam and lake on Tallahala Creek, 13 miles north of Laurel, for flood control, water supply, water quality control, recreation, and fish and wildlife enhancement.

All contracts have been completed except for the recreation contract. Plans and specifications for the expanded recreation will be initiated in 1993.

In 1978, an oil well began producing in the lake site area. In view of the oil field impact, an evaluation of environmental and economic factors was needed. During these detailed studies to reassess the feasibility of the project, the costs of construction were proven to be larger than the economic and environmental benefits. No further studies are planned for the Tallahala Lake at this time. However, specific water resource needs for the city of Laurel are being addressed under the Continuing Authorities Program.

Tallahala Creek, Laurel, Mississippi ***(Mobile District)***

Tallahala Creek flows in a southeasterly direction for approximately 100 miles where it joins the Leaf River near New Augusta, Mississippi. A report was prepared under the authority of Section 205 of the Flood Control Act of 1948, as amended, recommending clearing and snagging of 7.25 miles of Tallahala Creek. Preparation of plans and specifications was completed in 1989. The Local Cooperation Agreement was completed in 1988.

A flood warning system for the Tallahala Creek Basin was awarded and completed in 1990. The construction contract was awarded in 1992 and completed in October 1993. Total federal cost to date is \$641,058 for new work. The non-federal cost of the project is \$228,000. Contributed funds expended for new work amounted to \$40,000.

Upper Gordon's Creek ***(Mobile District)***

The Gordon's Creek is located in Hattiesburg, Mississippi. The existing project on the lower 2.5 miles was constructed in 1979 under Section 205 of the Flood Control Act of 1948. The project consisted of clearing and snagging from the creek's confluence with the Leaf River upstream to Bay Street, and channel widening to a 40-foot bottom width between Bay and Broad Streets. The new project consists of real

estate acquisition of 29 residences and removing same from flood plain. It also includes a habitat mitigation and channel enlargement (40-foot bottom width) for 1.1 miles between Broad and Hardy Streets. The construction of the channel improvements was completed in July 1995.

Estimated federal cost is \$2,843,000 and the nonfederal cost is \$1,181,000. Total federal cost to date is \$3,829,147 for new work.

Studies

Bayou Cumbest, Jackson County ***(Mobile District)***

Under the authority of Section 107 of the Rivers and Harbors Act of 1960, detailed project studies were initiated in 1983 to determine the feasibility of removing shoals to provide a safer and more efficient channel for use by commercial fishermen. A reconnaissance report prepared in 1983 recommended expanding the studies to more fully document the solutions to problems of navigational access to Bayou Cumbest.

Bayou Cumbest is located in an area designated as "preservation" in the Mississippi Coastal Plan. Studies have been deferred until resolution of the specific environmental and legal issues in the Mississippi Coastal Program.

Bowie Creek Lake ***(Mobile District)***

In 1974, Congress authorized Phase I general design studies of a dam and lake on Bowie Creek about 15 miles northwest of Hattiesburg to provide flood control, municipal and industrial water supply, recreation, and fish and wildlife enhancement. Located in the southwestern corner of Covington County at Mile 11 on Bowie Creek, the project would control the runoff from 293 square miles or about 45 percent of the Bowie River drainage area above Hattiesburg and would be similar to the existing Okatibbee Dam and Lake near Meridian. The project is currently inactive.

Escatawpa River, Mississippi ***(Mobile District)***

A Senate Resolution adopted 30 January 1973 authorized a survey under the urban studies program to consider water-related needs in the Gulf coastal areas comprised of Jackson, Harrison, and Hancock Counties.

Investigations of navigation needs in Jackson County were completed in 1988. Improvements provide for deepening the existing 12-foot by 125-foot channel to 14 to 18 feet, and maintaining Pascagoula River channel to 14-18 feet. The Pascagoula River channel is authorized to 22 feet but maintained to 12 feet. The Jackson County Port

Authority requested the Corps of Engineers terminate work on the Escatawpa River Feasibility Study and initiate work on an operation and maintenance study to consider the resumption of maintenance on the Pascagoula and Escatawpa rivers.

Greens Creek ***(Mobile District)***

A study was authorized under Section 205 of the Flood Control Act of 1948, as amended, to develop a plan for flood damage reduction in subdivisions of Petal along Greens Creek. The District Engineer's recommended plan involved raising the height of an existing guide levee along Greens Creek, tying it to high ground, and improving the drainage in the protected area.

The preparation of plans and specifications was initiated in 1988. However, due to restraints imposed by the Norfolk Southern Railroad, the project cannot be built as planned. Several alternatives were investigated, but none would provide a cost effective design that would satisfy the railroad concerns.

Orange Grove ***(Mobile District)***

Under the authority of Section 205 of the Flood Control Act of 1948, as amended, a study was conducted on flooding in the Orange Grove community in Jackson County. The study was completed in 1985 with a finding of no federal interest since the project cost exceeded the benefits for nonstructural measures.

Pascagoula Harbor Channel ***(Mobile District)***

To determine the feasibility of providing channel improvements for Pascagoula Harbor, a survey investigation was completed in 1984. The report recommended deepening and widening the Gulf entrance channel to 44 by 550 feet; relocating the channel about 500 feet westward and providing for future realignment as conditions warrant; deepening the main ship channel in Mississippi Sound to 42 feet; deepening and widening the Bayou Casotte Channel to 42 by 350 feet; and constructing a turning basin at the mouth of Bayou Casotte. It provided for bend widening at those locations presenting a problem to navigation and allowed for reconfiguring the impoundment basin at the entrance channel. The recommended improvements were authorized by the Water Resources Development Act of 1986.

The general design memorandum (GDM) was approved in June 1992. Pre-construction engineering and design was completed in September 1992. Total expenditures for engineering and design work were \$2,225,000.

Pascagoula River Basin Study ***(Mobile District)***

A survey study to investigate flood control and other needs of the Pascagoula River Basin was authorized by a Senate resolution adopted in June 1974 and a Senate Environment and Public Works Committee resolution adopted in 1977. The study included investigation into the water resource opportunities and needs in the Pascagoula River Basin in three principal areas: Hattiesburg and Petal, Mississippi, where flooding was a problem; Jackson County, Mississippi, where additional water supply will be required in the near future; and the Okatibbee Lake project area near Meridian, Mississippi, where a review of the project purposes was required, with the recognition of some existing operational constraints. However, since the Tallahala Lake project near Laurel, Mississippi, has proven not to be feasible, an investigation of alternative means to reduce flood damage at Laurel was performed as a fourth major segment of this basin study.

Feasible solutions to flood problems at Hattiesburg, Petal, and Laurel, Mississippi, were recommended under Section 205 of the Flood Control Act of 1948, as amended. Reallocation of water supply storage to another purpose at Okatibbee Lake is not feasible. The study of water supply for Jackson County was completed and the results were made available to the local interests.

The reporting on the overall basin study was accomplished in the form of a Letter Report. The Division Engineer's Public Notice was issued 1987. The Pat Harrison Waterway District was briefed on the contents and proposed recommendations in the report.

A request for resumption of the study was made in 1989 due to continued growth in the area. The study evaluated a basin-wide flood warning system, navigation on the Pascagoula River, flood control projects at Rawls Springs on the Bowie River and at Pascagoula on Bayou Chico, and low flow augmentation on the Pascagoula River.

The preliminary assessment phase which includes studies for flood control and navigation was completed 1993.

Flood Plain Management

Chickasawhay River ***(Mobile District)***

Residential, agricultural, and wooded lands affected by flooding in the vicinity of Waynesboro, Mississippi, on the Chickasawhay River. Report published in 1971.

Ellisville
(Mobile District)

A special flood hazard evaluation was performed at Rocky, Little Rocky, and Basin Branches in Jones County. Findings were published in 1987.

Gallagher Creek
(Mobile District)

Residential land is affected in the vicinity of Meridian, Mississippi, on Gallagher Creek. Report published in 1972.

Magnolia Creek and Robbins Branch
(Mobile District)

Residential lands subject to flooding in the vicinity of Meridian, Mississippi, on Magnolia Creek and Robbins Branch. Report published in 1974.

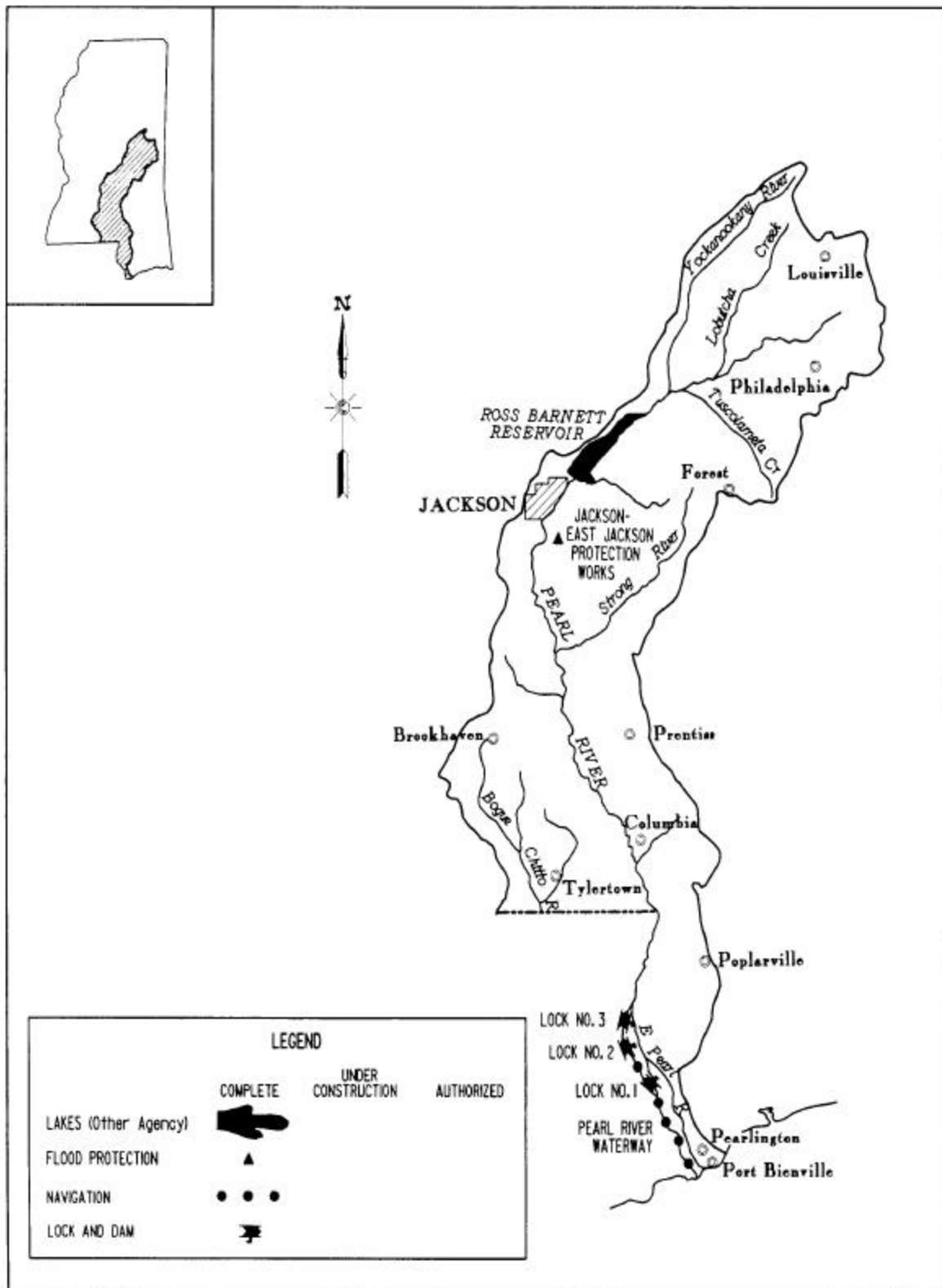
Meridian Naval Air Station
(Mobile District)

Commercial area and woodlands affected by streams in or near Meridian Naval Air Station. Report published in 1979.

Pascagoula-Gautier Coastal Area
(Mobile District)

Residential and commercial lands influenced by the East and West Pascagoula Rivers and Bayou Casottein the Pascagoula-Gautier coastal area. Report published in 1970.

Pearl River Basin



Pearl River Basin

The Pearl River Basin comprises most of the south central portion of Mississippi and a small part of southeastern Louisiana. The river drains an 8,670-square mile area, including 7,770 square miles in Mississippi. Roughly quarter-moon in shape, the basin has a maximum length of about 240 miles and a maximum width of about 50 miles.

The Pearl River rises in Neshoba County, where it is formed by the confluence of Nanaway and Tallahaga Creeks. It flows southwesterly 130 miles to the vicinity of Jackson, Mississippi, then about 240 miles southeasterly to the head of several distributaries, which regroup to form the West Pearl River in Louisiana. The main stem continues about 14 miles to the junction of Holmes Bayou and the former head of the East Pearl River. The old channel of East Pearl River, which forms the boundary between Mississippi and Louisiana at this point, no longer carries any flow between Holmes Bayou and Hobolochitto Creek except in extreme high water. The East Pearl River is now connected to the Pearl River by Farr Slough, which joins the Pearl River about 7 miles above Holmes Bayou, and by Hobolochitto Creek. The dry bed of the East Pearl River between Holmes Bayou and Hobolochitto Creek is 3 miles long. The East Pearl River below Hobolochitto Creek flows southward 38 miles to empty into Lake Borgne.

Principal streams tributary to the Pearl River are Lobutchka and Tuscolameta Creeks, the Yockanookany and Strong Rivers, and Bogue Chitto.

The Pearl River Basin lies in the East Gulf Coastal Plain. Elevations range from sea level along the coast to 650 feet, NGVD, in the northern portion. The topography varies from flat swampy lands in the south to moderately hilly lands in the north. The basin normally receives an abundant rainfall, fairly well distributed throughout the year.

The economy of the basin is changing from one based almost wholly on agriculture to one based largely on diversified manufacturing and other nonagricultural activities. Agriculture, however, continues to be an important factor. Principal towns in the basin are Jackson, Brookhaven, Picayune, Columbia, and Philadelphia, Mississippi and Slidell, Louisiana. In 1981, the Pearl River Basin was transferred from the jurisdiction of the Mobile District to the Vicksburg District.

Projects

East Pearl River ***(Vicksburg District)***

The existing project provides for a dredged channel 9 feet deep, 200 feet wide, and 1.3 miles long at the mouth of the river to connect the 9-foot contour in Lake Borgne with a 9-foot contour in the river. The total cost of the project to date has been approximately \$37,000 for new work and \$457,000 for maintenance. Traffic on the river for 1995 was 298,000 tons.

In October 1969, snagging and dredging were accomplished in Mulatto Bayou, a small tributary flowing into the East Pearl River near its mouth. The emergency operations were conducted to remove shoaling and debris resulting from Hurricane Camille and to permit harvesting and shipment of a large amount of timber blown down by the storm.

Jackson-East Jackson Flood Protection ***(Vicksburg District)***

The flood of December 1961, the last serious flood prior to initiation of the Jackson-East Jackson flood protection project construction, caused damages in excess of \$3.5 million. Without strenuous sandbagging and pumping efforts, damages might well have reached \$8 million.

Subsequent Congressional authorization provided for the construction of levees and channel improvements to protect much of these areas from floods several feet higher than the maximum flood of record. The project includes about 1.9 miles of levee and appurtenant drainage structures on the west bank; about 11.3 miles of levee and appurtenant drainage facilities on the east bank; and over 5 miles of rectified channel, including three cutoffs with a total length of 2.2 miles.

Construction on the project was initiated in 1964 and was essentially completed in 1968. The works were turned over to the Rankin-Hinds Pearl River Flood and Drainage Control District for operation and maintenance. Total Federal cost of the project was \$7,190,200. These flood control structures provide a high degree of flood protection for the Mississippi State Fairgrounds and the Flowood-East Jackson urban areas. However, a record-breaking flood over the 1979 Easter weekend caused widespread damage estimated at \$300 million. The East Jackson levee held during that flood; however, the fairground levees were flanked causing considerable damages in that area. In May 1983, the Jackson area again experienced a flood of major proportions. An estimated \$31.9 million in property damages occurred. In 1984, the Vicksburg District extended the fairground levees to prevent future flanking of the levee system. This work cost \$200,000 and was accomplished with Jobs Bill monies.

Flood control benefits accruing prior to the 1979 flood amounted to \$36.7 million, of which, \$32.9 million was from reduced damages and \$3.8 million from changed land use. Damages reduced in the 1979 flood are estimated to be \$235 million. Between 1980 and 1983, four floods of a 5-year frequency or greater occurred in Jackson. Estimated benefits from the levees during these floods amounted to about \$150 million.

The 1983 Supplemental Appropriations Act (P.L. 98-63) authorized additional measures to reduce flooding in the vicinity of Jackson. In 1984, Congress appropriated \$16 million for the authorized construction of the Four Point Plan in Jackson. This plan included clearing approximately 3.5 miles of floodway, enlarging the opening at the Highway 25 Bridge, modification of the reservoir to allow operation for interim flood control purposes, and cutting off a channel bendway downstream of Interstate 20. The

modification of the reservoir and the bendway cutoff were eliminated from the final plan due to economic infeasibility.

A construction contract on the clearing work was completed in 1985. Construction of riprap bank protection at the ICG Railroad Bridge, an integral part of this project, was completed in 1987. Improvements at the Highway 25 Bridge were made by the local sponsor in 1982, and the Corps has reimbursed the sponsor to cover the federal cost of the project. Total federal cost was approximately at \$2 million.

Pearl River in the vicinity of Walkiah Bluff, Mississippi and Louisiana
(Vicksburg District)

The Pearl River, in the vicinity of Walkiah Bluff Mississippi and Louisiana Project, investigated the flow distribution between the Pearl River and Holmes Bayou in relation to the flows in Wilson Slough and the West Pearl River. Wilson Slough is now capturing more than 95 percent of the flow during low-flow conditions. If unchecked, Wilson Slough would have eventually captured all of the low flow going down the Pearl River, the state boundary between Mississippi and Louisiana.

The recommended plan consisted of a rock weir in an old bendway of the Pearl River near the inlet of Wilson Slough that would provide a 50-50 low-flow distribution between Wilson Slough and the Pearl River. The plan also includes closures at four distributaries of the Pearl River below the rock weir and construction of a pilot channel within the streambed of the Pearl River between the rock weir and the outlet of Moore's Bayou. Construction of the weir and four closures would require approximately 10.6 acres of lands within the Bogue Chitto National Wildlife Refuge. A determination that the project is compatible with the Refuge was received from the U.S. Fish and Wildlife Service.

Benefits realized with completion of the project included habitat unit gains in various wetland resource categories. These include freshwater mussels, fisheries and wetland functional value. The total cost of the project to date is \$8,580.

The project was essentially completed in December 1999.

West Pearl River Waterway
(Vicksburg District)

The existing navigation project on the West Pearl River was authorized by the Rivers and Harbors Act of 1935. The project was completed in 1956 and provided navigation from its mouth to the vicinity of Bogalusa, Louisiana, a distance of approximately 58 miles. The channel was constructed to a depth of 7 feet with a bottom width of 100 feet in the river section and 80 feet in the canal section. The Pools Bluff and Bogue Chitto Sills were constructed to control water levels in the navigation channel. Three locks with inside dimensions of 65 by 310 feet (chamber dimensions) were provided in the 20.2-mile canal sections.

In the early 1970s, commercial traffic declined to the extent that continued maintenance of the channel and canal dimensions could not be justified; therefore, maintenance dredging of the navigation project was suspended and the lock structures were placed in a caretaker status. Currently, the primary use of the waterway is for recreational purposes. At the request of local interests in Slidell and Bogalusa Louisiana, a reevaluation of the existing project was conducted. This investigation was to determine the economic and environmental feasibility of maintaining the project to authorized dimensions. Additional environmental concerns prompted an environmental impact statement for the West Pearl River Navigation Project.

The final EIS was filed with the Environmental Protection Agency in March 1994. The Corps rescinded the Record of Decision on August 8, 1995, based on the discovery in the project area of shells of the threatened inflated heelsplitter mussel. The government has prepared a Biological Assessment that concluded the project may affect the threatened inflated heelsplitter mussel and reinitiated formal consultation with the U.S. Fish and Wildlife Service in accordance with the Endangered Species Act.

The U.S. Fish and Wildlife Service issued a Biological Opinion in July 1996 that concluded the project would not jeopardize the continued existence of the ringed sawback turtle, Gulf sturgeon or the inflated heelsplitter mussel. Prior to completion of the NEPA documentation, limitations in funding nationwide for operations and maintenance negated the need for further investigation and all studies were terminated.

Studies

Caney Creek, Jackson, Mississippi ***(Vicksburg District)***

The Caney Creek study area is located in the corporate limits of Jackson. The headwaters of Caney Creek originate in the vicinity of Mississippi Highway 18, just south of Interstate 20, and flow in a southeasterly direction through residential areas to Parham Bridges Park at Interstate 55 south and then to the Pearl River. Flooding and extensive erosion have occurred throughout commercial and residential areas. Local interests have requested channel improvements and bank protection to Caney Creek. Funds to initiate reconnaissance studies were received in 1989.

Study findings indicate the majority of flood damage occurs in the lower reaches of Caney Creek from backwater flooding from the Pearl River. Flooding from the Pearl River was addressed in the Pearl River Watershed Study described below. Flood damage attributable to headwater flooding from Caney Creek is relatively insignificant. The study was terminated upon completion of the reconnaissance report.

Pearl River Watershed, Mississippi ***(Vicksburg District)***

The Jackson, Mississippi, Metropolitan Area, a primary regional economic center, has major flood problems attributable to the Pearl River with annual flood damages of approximately \$12 million. The flood of record occurred in April 1979, causing an estimated \$300 million in damages. Previous studies conducted as a part of the comprehensive Pearl River Basin Study found Shoccoe Dam to be the best plan to address flooding problems in the Jackson metropolitan area. The final report recommending Shoccoe Dam was completed in 1985. Shoccoe Dam was subsequently authorized for construction by the Water Resources Development Act of 1986 (P.L. 99-662).

However, as a result of upstream opposition, Shoccoe Dam is no longer implementable, and preconstruction engineering and design studies for this project have been suspended. At the request of local interests, reconnaissance studies were completed in 1990 to evaluate alternatives to Shoccoe Dam.

A feasibility cost sharing agreement between the Corps and the Pearl River Basin Development District was executed in 1991 and the feasibility study was initiated in October 1991. A draft report and draft environmental impact statement were coordinated for public review in February 1996 recommending construction of a comprehensive levee plan to protect the metropolitan area against a flood the magnitude of the 1979 flood of record. Completion of a study has been delayed due to the inability of the non-federal sponsor to develop a financial plan to cost-share construction of the project.

An evaluation of a Two Lake Plan proposal by flood control interest in the Pearl River Basin and an alternative to control flooding in the Jackson, Mississippi, metropolitan area along the Pearl River were initiated in July 2000. The Two Lake Plan would consist of the construction of two lakes (an upper lake and lower lake) along the Pearl River south of the Ross Barnett Reservoir. The lakes would extend from the Ross Barnett Reservoir outlet downstream along the Pearl River to approximately one mile southwest of Interstate 20. The combined lakes would cover approximately 4,800 acres when at normal operating levels. The plan also proposes the creation of an approximately 600-acre island within the upper lake. The evaluation will address the engineering, environmental, economic aspects, of the proposal plan. Results from the evaluation will be used to determine if detailed investigation of the plan should be undertaken in further feasibility studies. The evaluation is cost shared between the Corps and Pearl River Basin Development District. The evaluation is scheduled to be completed in November 2000.

Lower Pearl River Basin Flow Distribution
Study, Mississippi and Louisiana
(Vicksburg District)

At the request of the governors of Louisiana and Mississippi and the Pearl River Basin Development District, the Vicksburg District conducted flow distribution studies along the Lower Pearl River. Local interests indicate low-flow problems are impacting the flow regime and related land resources in the Lower Pearl River Basin. Funds to initiate the reconnaissance study were received in 1988.

Specific problems and needs addressed included recreation, fish and wildlife, water supply, water quality, saltwater intrusion and commercial navigation. Potential solutions evaluated included construction of water control structures at several locations and channel improvement. Because this study preceded the authorities for the Corps to participate in environmental restoration projects, the reconnaissance study did not find any problem that could be resolved by a federal project. The study was terminated with the completion of the reconnaissance phase.

Pearl River Basin Study,
Mississippi and Louisiana
(Vicksburg District)

The comprehensive Pearl River Basin study was conducted in response to eight Congressional resolutions dating from 1963 to 1979 which primarily concern flood control and navigation. The study was initiated in 1979 by the Mobile District. In 1981, responsibility for the Pearl River Basin was transferred from the Mobile District to the Vicksburg District.

Mobile District completed the reconnaissance report for the entire Basin in 1981 and held public workshops throughout the Basin in December 1981. Major interim studies conducted under the comprehensive authority included the Pearl River Basin Interim Report on Flood Control, which recommended construction of Shoccoe Dam and Slidell, Louisiana, and Pearlinton, Mississippi, Interim Report on flood Control. Numerous reconnaissance studies were also conducted under this authority. These included Bogue Chitto Basin; Carthage Upper Pearl Basin, Columbia, Monticello and Picayune, Mississippi, and Bogalusa, Louisiana.

Ross Barnett Reservoir Operational Analysis and Pearl River Bank Caving Assessment, a partnership with the MDEQ, PRBDD, and PRVWSD under the planning assistance to states program studying downstream bank caving problems and reservoir regulations, 1977.

Slidell, Louisiana, and Pearlinton, Mississippi
(Vicksburg District)

The Slidell, Louisiana, and Pearlinton, Mississippi, flood control studies evaluated the feasibility of various alternatives that would provide protection from Pearl River flooding. Major flooding from the Pearl River was experienced in the Slidell area in 1979, 1980, and 1983. During these times, minor flooding was also experienced in the Pearlinton area. A final report recommending a 15-mile levee system for Slidell, Louisiana, was completed in June 1986. No feasible plans were identified for the Pearlinton area. The Slidel/St. Tammany Parish levee system with appurtenant structures will protect the Slidell area from flooding associated with a 200-year event on the Pearl River and provide the same level of protection against hurricane surges. This levee project was authorized by the Supplemental Appropriation Act of 1985 (P.L. 99-88 and P.L. 99-662). The project sponsor, the St. Tammany Parish Levee District, and the Assistant Secretary of the Army signed a Local Cooperation Agreement in 1986. Because of the failure of a local funding referendum, the local sponsor has been unable to fund their share of the project and the project has been terminated.

Flood Plain Management

Caney Creek
(Mobile District)

Vicinity of Jackson, Mississippi, on Caney Creek. Predominant types of land in the area subject to flooding were residential and commercial. Report published in 1969.

Hanging Moss and White Oak Creeks
(Mobile District)

Report covered residential and commercial lands on Hanging Moss and White Oak Creeks at Jackson, Mississippi. Report published in 1975.

**Hobolochitto Creek and East
and West Hobolochitto Creeks**
(Mobile District)

Flood hazard report on residential, agricultural, and woodlands on East and West Hobolochitto Creeks at Picayune, Mississippi. Report published in 1970.

Lynch Creek

(Mobile District)

Report on residential and commercial lands in flood-prone areas on Lynch Creek at Jackson, Mississippi. Report published in 1971.

Pearl River and Neely Creek

(Mobile District)

Report on residential and commercial lands in flood-prone areas on Pearl River and Neely Creek in Jackson, Mississippi, and Rankin County. Report published in 1973.

**Pearl River, Town Creek,
Pollard Creek and Tributary**

(Vicksburg District)

Flood hazard evaluation of the 100 and 500-year frequency flood plains, Carthage, Mississippi. Report published in 1999.

Purple Creek

(Mobile District)

Flood-prone areas studied included residential and commercial lands on Purple Creek at Jackson, Mississippi. Report published in 1968.

**Strong River and Sellers
and Terrapin Creeks**

(Mobile District)

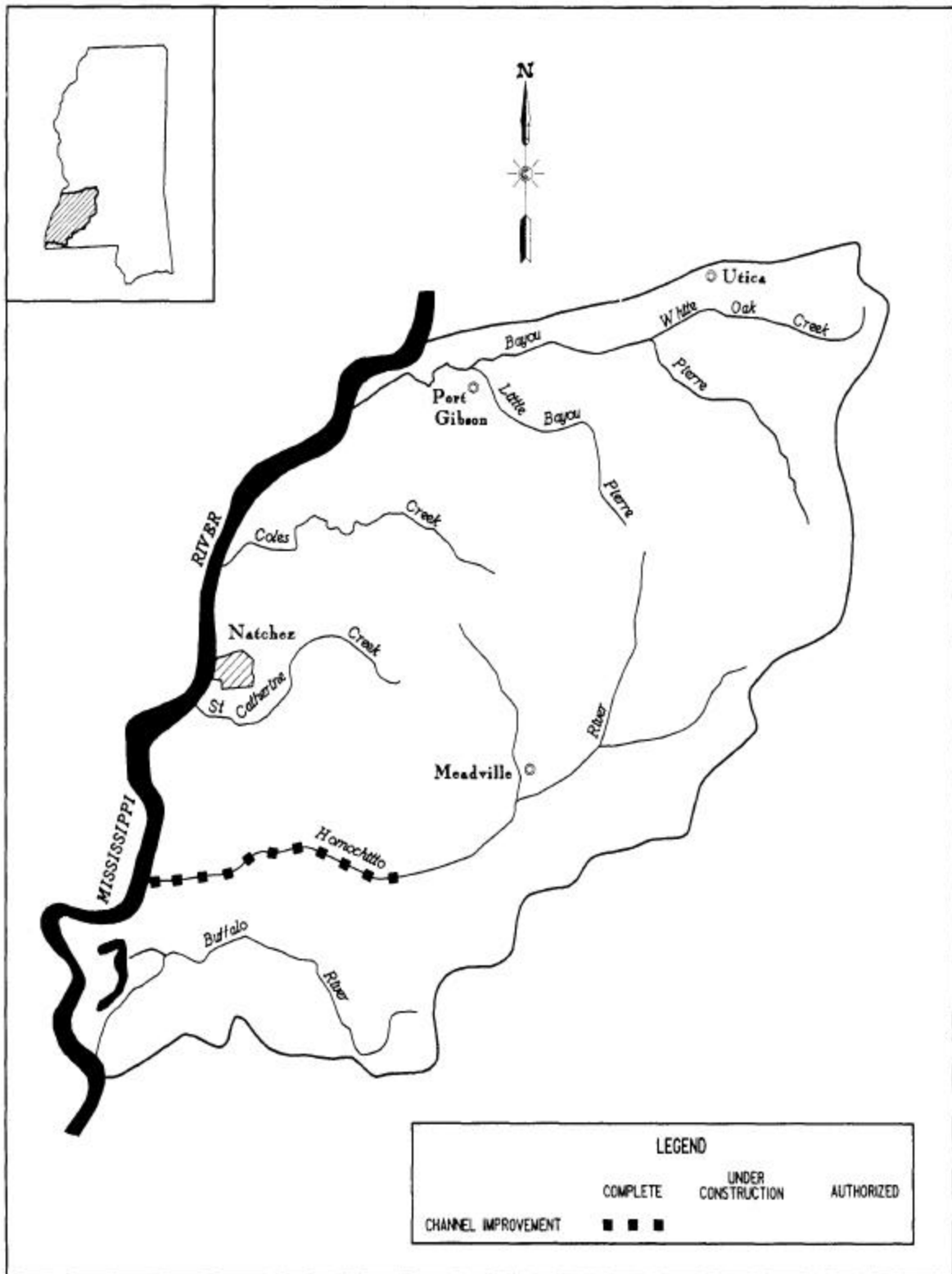
Residential, agricultural, and woodlands identified as being in flood-prone areas on Strong River and Sellers and Terrapin Creeks in vicinity of Mendenhall, Mississippi. Report published in 1974.

**Yockanookany River,
Dye Ditch, and Munson Creek**

(Mobile District)

Flood hazard report on residential, commercial, agricultural, and woodlands in flood-prone areas, vicinity of Kosciusko, Mississippi, on Yockanookany River, Dye Ditch, and Munson Creek. Report published in 1972.

Southwest Mississippi Tributaries Basin



Southwest Mississippi Tributaries Basin

The Southwest Mississippi Tributaries Basin, located in southwestern Mississippi, comprises a drainage area of about 3,200 square miles. The basin extends in an east-west direction for about 55 miles and extends in a north-south direction for about 60 miles. Three major streams - the Buffalo River, the Homochitto River, and Bayou Pierre - drain most of the area and flow directly into the Mississippi River. Other tributaries that drain into the Mississippi River are St. Catherine and Coles Creeks.

The basin's terrain consists primarily of upland or hill area and Mississippi River alluvial area. The topography of the hill area, known as "Loess Hills," is rugged and steep with narrow ridge tops.

Elevations along the eastern and southern perimeter of the basin exceed 400 feet, NGVD, in places. Near the alluvial flatlands, the hill elevations extend to heights of about 300 feet, NGVD. The alluvial area, interlaced with swampland, lakes, and agricultural lands, extends along the Mississippi River east bank and is very flat. Elevations range from 50 to 70 feet, NGVD.

Agricultural activities, including timber production, constitute a major segment of the total economy of the basin. Industrial development relates primarily to agriculture and wood products. Flooding in the basin usually occurs during the winter and spring months. Flood damages occur to agricultural operations, public roads and bridges, and to improvements in built-up areas. Improvements constructed on the Homochitto River during the period 1938-1948 are no longer maintained. No improvements have been constructed on other basin streams.

Projects

Homochitto River ***(Vicksburg District)***

Improvements on the Homochitto River were completed in 1948. These improvements consisted primarily of excavation of cutoffs and clearing and snagging. Improvement of the channel has occurred only in the lower 35 miles of the Homochitto River.

No works of improvement have been constructed on Bayou Pierre, Buffalo River, or other streams in this area. Authorized work on the Buffalo River was deauthorized by the Water Resources Development Act of 1986 (P.L. 99-662). Presently, improvements constructed on the Homochitto are not being maintained and are inactive.

Studies

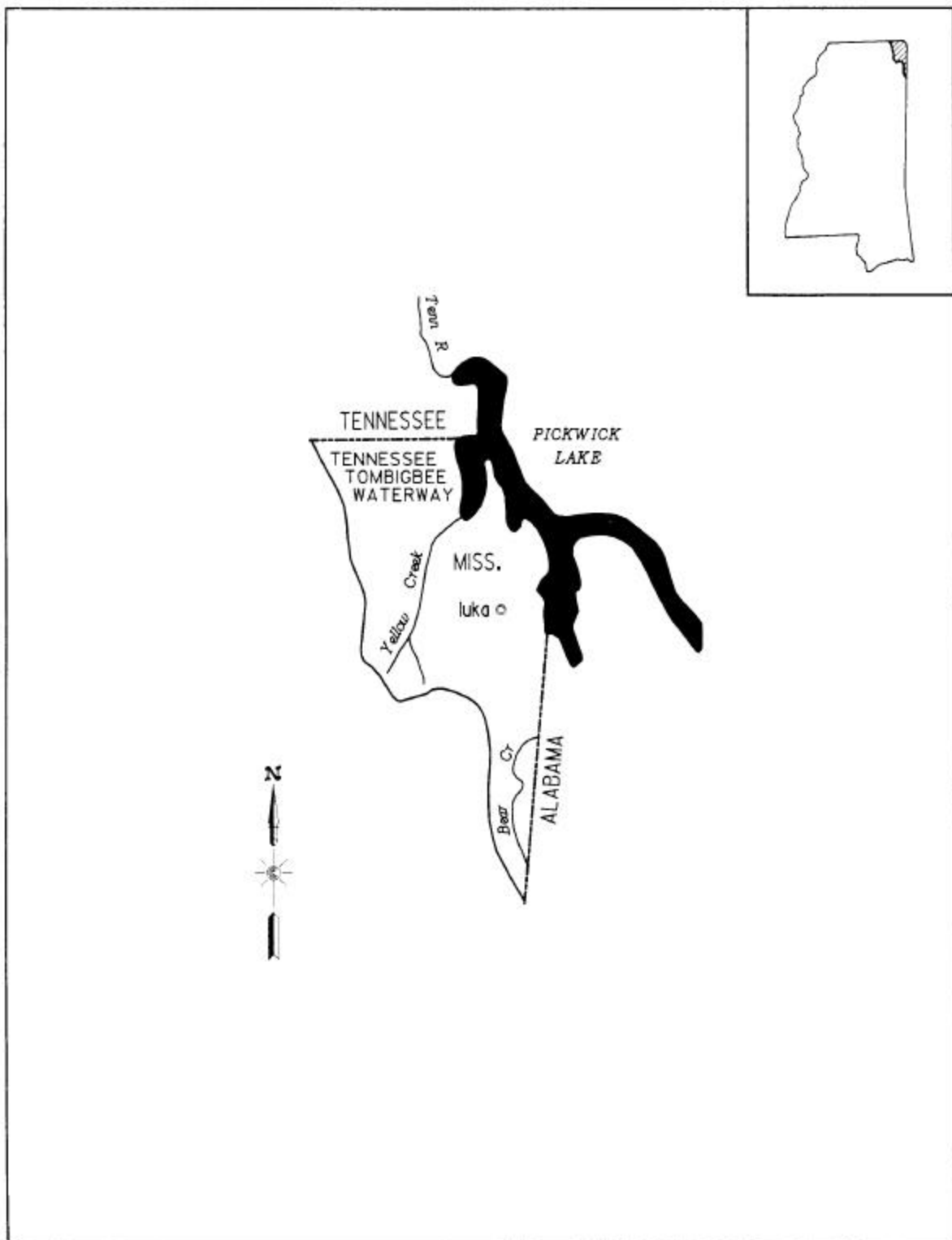
Southwest Mississippi Tributaries Basin Study *(Vicksburg District)*

In 1983, Congress authorized comprehensive studies of the basin to determine the feasibility of improvements in the interest of flood control, bank caving, sedimentation, and related purposes. Reconnaissance level investigations were initiated in September 1983, focusing on Homochitto River Subbasin, the Bayou Pierre Subbasin, and the Mississippi River east bank.

The Vicksburg District concentrated on the problems along the primary streams and in the Mississippi River alluvial area. The Soil Conservation Service assisted in the study by considering the needs in the upstream watersheds. Reconnaissance phase studies were completed and the final report submitted to the Mississippi River Commission in May 1985.

No feasible plans were developed. The final report was transmitted by the Assistant Secretary of the Army (Civil Works) to Congress in 1986.

Tennessee River Basin



Tennessee River Basin

A small portion of the Tennessee River Basin lies within the State of Mississippi, in the extreme northeastern sector, in Tishomingo County. The northeastern boundary of Tishomingo County is Pickwick Lake on the Tennessee River. Yellow Creek, which is a tributary of the Tennessee River, begins in Tishomingo County just west and south of Iuka Mississippi. Yellow Creek flows north and northeast to enter the Tennessee River (Pickwick Lake) in the northeastern corner of Tishomingo County near the state boundary. Bear Creek, also a tributary of the Tennessee River, enters the eastern portion of Tishomingo County from Alabama where it flows northward for a short distance then reenters Alabama. Upland hills predominate as the main topographical feature, and streams in the area flow through well-defined valleys.

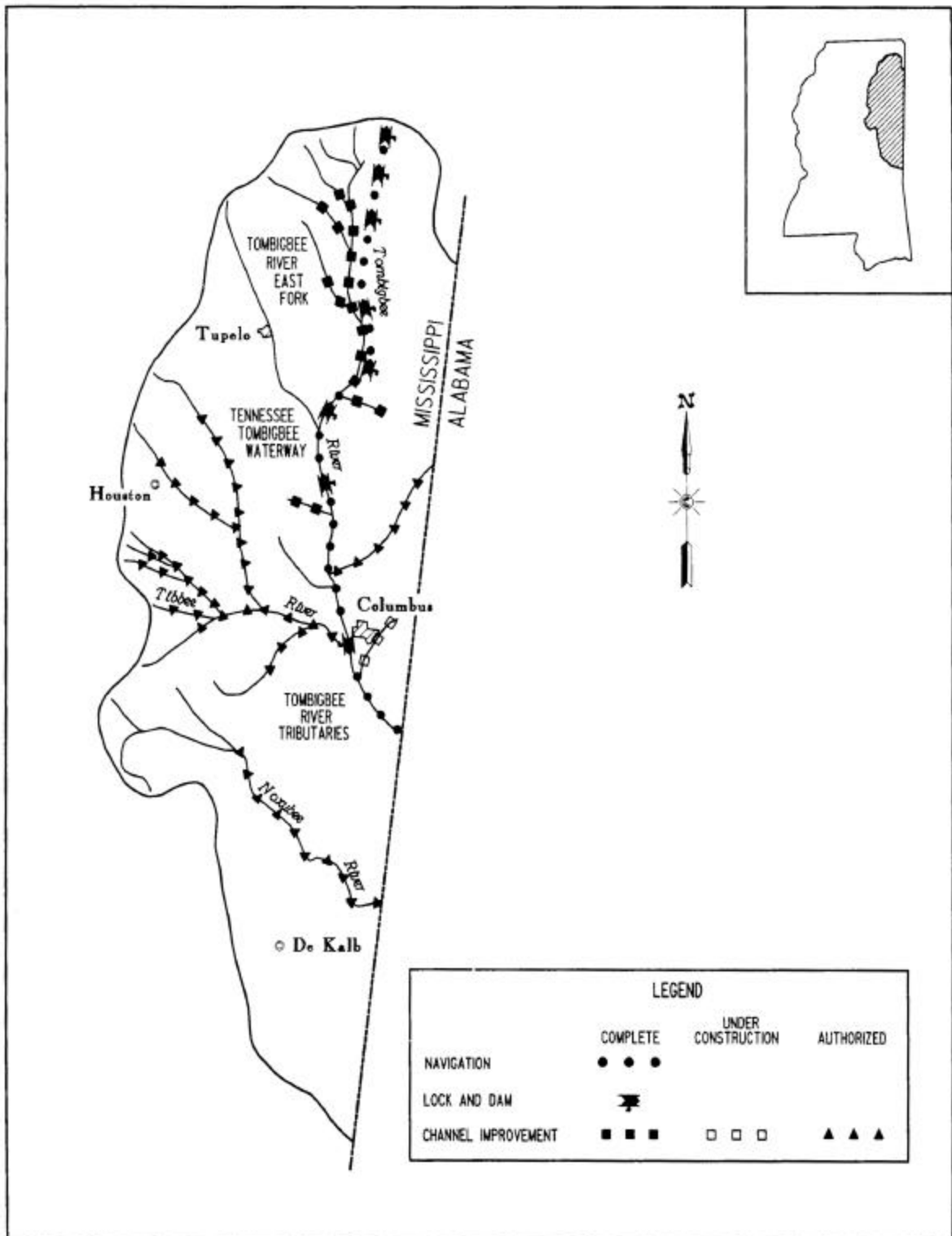
Projects

Tennessee River ***(Nashville District)***

The existing navigation facilities on the Tennessee River provide a 9-foot channel from the mouth to Knoxville, Tennessee, a distance of about 650 miles. The project depth is provided by a system of locks and dams constructed by the Tennessee Valley Authority since 1933 and certain locks and dams previously constructed by the Corps. The Corps of Engineers operates all of the locks and maintains navigation channels and safety harbors by performing all necessary dredging and snagging operations. This waterway touches the northeastern portion of Mississippi.

The publications, "Water Resources Development by the U.S. Army Corps of Engineers in Tennessee" and "Water Resources Development by the U.S. Army Corps of Engineers in Alabama" contain additional information concerning this waterway.

Tombigbee River Basin



Tombigbee River Basin

Approximately one-third of the Tombigbee River Basin lies in northeast Mississippi with the remainder in Alabama. The river is formed by the junction of Mackeys and Big Brown Creeks in Itawamba County, Mississippi, and flows southeastward and then southerly for 442 miles to its junction with the Alabama River about 45 miles north of Mobile. An estimated 147 miles of its length is in Mississippi. It leaves the state near the center of the eastern boundary.

The principal tributaries of the Tombigbee River in Mississippi are Town Creek (formerly known as the West Fork), which joins near Amory; the Buttahatchie River, which joins south of Aberdeen; the Tibbee River and Luxapalila Creek, which join near Columbus; and the Noxubee River, which rises near Starkville, Mississippi, and joins the Tombigbee River near Gainesville, Alabama.

The Tombigbee River drains an area of about 6,128 square miles in Mississippi. This portion of the basin is about 190 miles long and about 70 miles wide at its widest point. It lies mostly in the coastal plain and is characterized by a series of hilly belts with elevations ranging from about 140 feet, NGVD, near the point where the river crosses into Alabama to about 560 feet, NGVD, in the northern portion of the basin.

Rainfall is plentiful throughout the year, inducing general flooding on an average of once every 10 years and intense local flooding several times a year.

Although the economy of the region is still predominantly agricultural, the basin is experiencing a rapid influx of light manufacturing. The principal towns are Columbus, Tupelo, Starkville, West Point, Aberdeen, and Amory.

Projects

Airport Road Bridge ***(Mobile District)***

A study of streambank erosion problems at Airport Road Bridge over Twentymile Creek near Frankstown was conducted under authority of Section 14 of the Flood Control Act of 1946, as amended. The approved project provides for stream bank protection along a 300-foot reach of the stream. The creek's banks and bottom were graded and protected with 24 inches of riprap on 6 inches of bedding material and filter fabric. A 3-foot-high weir was placed just downstream from the bridge. Local cooperation requirements were fully complied with.

The project was essentially completed in December 1984 and has been turned over to local sponsor to maintain. Construction costs to date total approximately \$215,900.

Big Brown Creek ***(Mobile District)***

The project is located at the Marietta-Hazeldell Road bridges crossing Big Brown Creek and Big Brown Creek tributary located about 2 and 2.2 miles, respectively, east-northeast of Marietta in Prentiss County, Mississippi.

The authorized project provides for emergency streambank protection to the banks, and the bottoms have been graded and protected with 24 inches of riprap on 6 inches of bedding material and filter fabric. The placement of the riprap at the bridge crossing Big Brown Creek begins 50 feet downstream from the centerline of the bridge and extends upstream for 100 feet. The placement of the riprap at the bridge crossing Big Brown Creek tributary begins 60 feet downstream from the centerline of the bridge and extends upstream for 100 feet. Local cooperation requirements were applied and the project was turned over to the local sponsor to maintain.

Project construction was initiated in 1986 and completed in 1987. Construction costs to date total \$137,500.

Burketts Creek ***(Mobile District)***

Authority for the development of a flood control project on Burketts Creek is contained in Section 205 of the Flood Control Act of 1948, as amended. The project is located in the northeast portion of the city of Amory and lies between Burketts Creek and the Tennessee-Tombigbee Canal Section near Lock A.

To reduce flood damage along the creek, an earth-filled diversion structure and a 60-foot-wide bottom width diversion canal were constructed to intercept Burketts Creek at station 100+55 and direct flow in a northerly direction for about 4,000 feet to enter Lock A pool at canal station 2+00. In addition, provisions are made for a concrete baffled chute as an energy dissipator and a riprap blanket at the toe.

Construction of the project was initiated in September 1982 and completed in September 1983. Total cost was approximately \$1,366,000. The project was turned over to local interests for operation and maintenance in 1984.

Centerville to County Line Road Bridge ***(Mobile District)***

The project is located approximately 1 mile west of Centerville along an unnumbered county road between County Highway 363 and the county line. The Mantachie Creek drainage area is located in northeast Mississippi and is a part of Tombigbee River Basin.

The project authorized by Section 14 of the Flood Control Act of 1946, as amended, provides protection for both banks and the channel at the bridge crossing Mantachie Creek. This would preclude any streambank erosion from high velocities or from sudden drawdown associated with receding floodwaters. A construction contract was awarded in 1989 and completed in 1990. Total federal cost to date is \$116,800 for new work. Contributed funds expended for new work amounted to \$28,109.

Goodfood Creek ***(Mobile District)***

The project is located at Goodfood Creek Road about 1.5 miles east of U.S. Forest Service's Davis Lake recreation area in the northern portion of Chickasaw County, Mississippi.

The authorized project provides for bridge protection using riprap extending 30 feet up and down- stream of the bridge. Local cooperation requirements were applied and the project was turned over to the local sponsor for maintenance.

Project construction was initiated and completed in 1986. Construction costs to date total \$91,500.

Houlka Creek ***(Mobile District)***

Construction began in late 1979 and was completed in early 1980 for emergency clearing and snagging of Houlka Creek in Clay and Chickasaw Counties at a cost of about \$238,219 to alleviate flooding of agricultural lands.

Houston School Road Bridge ***(Mobile District)***

Houston School Road Bridge crosses Tynes Branch, a Twentymile Creek tributary, and is located about 2 miles west of Houston in northwest Itawamba County, Mississippi.

The project provides for bridge protection using riprap extending 62 feet downstream of centerline of the bridge and extending upstream for 99 feet. Local cooperation requirements were fully applied and the project was turned over to the local sponsor to maintain.

The project was initiated in 1986 and completed in 1987. Construction costs to date total \$59,300.

Hurricane Creek ***(Mobile District)***

The project is located in southeast Prentiss County, Mississippi. The bridge crosses Hurricane Creek, and is located about 20 miles northeast of Tupelo, Mississippi. The project, authorized by Section 14 of the Flood Control Act of 1946, as amended, provides emergency streambank protection to the banks and the bottoms of the channel to retard erosion at the Marietta-Hazeldell Road Bridge crossing Hurricane Creek. This would preclude any streambank erosion from high velocities or sudden drawdown associated with receding floodwaters.

A construction contract was awarded and completed in 1989. Construction cost to date total is \$65,612.

Magby Creek ***(Mobile District)***

The project is authorized under Section 205 of the Flood Control Act of 1948, as amended; and consists of clearing and snagging the Magby Creek from Mile 0.83 upstream to Mile 2.06. An additional 60 feet on the right overbank will be cleared of underbrush and any trees less than 6 inches in diameter. This 60 feet will alternate to the left bank, where there are deep bands, creating a straighter floodway effect. A construction contract was scheduled to be advertised in March 1989, and completed in August 1989.

Marietta-Hazeldell Road Bridge ***(Mobile District)***

The project is located in southeast Prentiss County, Mississippi. The bridge crosses Hurricane Creek Tributary to Big Brown Creek and is located about 20 miles northeast of Tupelo, Mississippi.

The project authorized by Section 14 of the Flood Control Act of 1946, as amended, provides emergency streambank protection to the banks and the bottoms of the channel to retard erosion at the Marietta-Hazeldell Road Bridge crossing Hurricane Creek, a tributary to Big Brown Creek. This would preclude any streambank erosion from high velocities or sudden drawdown associated with receding floodwaters.

Preparation of plans and specifications were initiated in October 1988. A construction contract was advertised in March 1989 and construction completed in September 1989.

Martin Creek ***(Mobile District)***

The project is located at the Altitude Road Bridge crossing Martin Creek about 6.7 miles east-southeast of Booneville in Prentiss County, Mississippi. The project provides for emergency streambank protection to the banks and the bottom of the channel to retard erosion at the Altitude Road Bridge crossing Martin Creek. The banks and bottom have been graded and protected with 24 inches of riprap on 6 inches of bedding material and filter fabric. Two hundred linear feet of barbed wire fence were moved. Two acres of land were required for construction of the project. Local cooperation requirements were fully complied with and the project turned over to local sponsor to maintain.

Project construction was initiated in FY 86 and completed in January 1987. Construction costs to date total \$78,500.

Noxubee River ***(Mobile District)***

The Noxubee River relief bridge is located on the Shuqualak-Mahorner Road near Shuqualak; Mississippi. The Noxubee River at this location flows through Noxubee County, which is located in east-central Mississippi. The project is about 48 miles south of Columbus, Mississippi.

The project provides for streambank protection at Noxubee River relief bridge consisting of grading and bank protection with 24 inches of riprap on 6 inches of bedding material and filter fabric. This would preclude any erosion from high velocities or from sudden drawdown associated with receding floodwaters. Local cooperation requirements were applied and the project was turned over to the local sponsor to maintain.

Project construction was initiated and completed in 1986. Construction costs to date total \$119,500.

Osborne Creek ***(Mobile District)***

A streambank protection project at Highway 362 Bridge over Osborne Creek, Prentiss County, was authorized under Section 14, Flood Control Act of 1946, as amended. The project provides restoration and stabilization of the creek banks under and around the bridge to remove the danger of bridge failure from erosion. A low weir constructed downstream will provide a backwater effect at the bridge and encourage small amounts of deposition upstream. Construction was completed in 1983. Construction costs to date total \$250,000.

Old Highway 82 Bridge ***(Mobile District)***

The Old Highway 82 Bridge, is located at Columbus, Mississippi, in east-central Mississippi, crosses the Tombigbee River at river mile 364.96. It is about 131 miles northeast of Jackson, Mississippi.

The project provides protection along the right descending bank. The slope protection consists of 24 inches of riprap on 6 inches of bedding material and a filter fabric. The riprap placement begins approximately 140 feet downstream of the centerline of the bridge and extends upstream along the right descending bank for 330 feet. Local cooperation requirements were applied. The construction was completed in 1985. Construction cost to date totals \$143,936.

Tallabinella Creek ***(Mobile District)***

The project, located along Tallabinella Creek at Pleasant Valley Road about 3.5 miles northwest of the city of Okolona in northeast Chickasaw County, provides for bridge protection using riprap extending 30 feet up and downstream of the bridge. Local cooperation requirements were applied and the project was turned over to local sponsor to maintain. Project construction was completed in 1986. Total construction cost to date is \$81,000.

Tennessee-Tombigbee Waterway ***(Mobile District)***

Early Spanish and French explorers considered a navigable waterway connection between the Tennessee and Tombigbee Rivers, and the federal government made numerous investigations over a long period of years of the feasibility of such a project. The tremendous undertaking was authorized by Congress in 1946.

The project is divided into three reaches. The 149-mile-long river section extends up the Tombigbee River from Demopolis, Alabama, to the vicinity of Amory, Mississippi, and includes river channel improvements and conventional lock and dam construction near Gainesville and Aliceville, Alabama, and Columbus and Aberdeen, Mississippi.

The 46-mile-long canal section, which includes five locks, parallels the Tombigbee River on the east from near Amory to a point on Mackeys Creek near Old Bay Springs in the southwest corner of Tishomingo County.

The 39-mile-long section extends from Bay Springs to the Yellow Creek arm of Pickwick Lake on the Tennessee River near the common boundary of Mississippi, Alabama, and Tennessee. The section includes a high-lift lock and dam at Bay Springs and a 27-mile-long cut through the divide separating the Tombigbee and Tennessee Rivers.

The river section is 9 feet deep and the canal and divide sections are 12 feet deep. The bottom width is 300 feet, except in the divide cut, where it is 280 feet.

The lock chambers are 110 feet wide by 600 feet long and have a depth of 15 feet over the miter sills, corresponding to the new locks on the connecting waterways. The locks provide a total lift of 341 feet to overcome the difference in elevation between Demopolis Lake on the Tombigbee River and Pickwick Lake on the Tennessee River.

The waterway is a run-of-the-river system, with reservoirs largely within the original riverbanks and with no storage provided for the regulation of riverflows.

Joining the north-flowing Tennessee River and the south-flowing Tombigbee River creates an entirely new transportation artery connecting much of the interior of the United States with the Gulf Coast. Besides bringing the advantages of waterborne transportation to the area it traverses, the new waterway provides an additional means for interchanging commerce between the Gulf Intracoastal Waterway, which connects all ports and waterways along the Gulf Coast, and the vast inland waterway network made up of the upper Mississippi, Illinois, Missouri, Ohio, Cumberland, and Tennessee Rivers. It considerably shortens distances between the interior and the eastern Gulf region.

Other tangible benefits include recreation, fish and wildlife enhancement, and employment opportunities created by the construction and maintenance of the waterway. Benefits of a less tangible nature, but nevertheless of great importance, will result from lower production costs created by the low-cost waterway transportation service. These include expansion of agricultural and industrial production, land enhancement through the conversion of idle lands to more productive use, encouragement of decentralization of population and industry, stimulation of foreign trade and advancement in standards of living.

The first supplemental environmental report, covering the continuing studies, was furnished to the Council on Environmental Quality in 1975. An additional supplemental report was issued in 1977, and a third was published in 1984.

Funds to initiate construction were appropriated in 1971, but work was delayed by an environmental suit. Construction was begun on the Gainesville Lock and Dam, the first structure above Demopolis, Alabama, in 1972. The pools were raised as follows: Gainesville in 1978, Aliceville in 1979, Columbus in 1981, Aberdeen in 1984, Locks A through D in 1984, Lock E in 1984, and Bay Springs in 1983. The waterway was opened for navigation in 1985 with official dedication ceremonies following in June.

Docks, storage facilities, and handling equipment are still being developed along the new waterway. By 1988, 12 such facilities were operational, while five were under construction, and five more are planned. The operational facilities are handling grain, wood chips, and logs. When all facilities are complete, about half will be publicly owned and operated.

Tennessee-Tombigbee Waterway Wildlife Mitigation, Alabama and Mississippi (Mobile District)

The Wildlife Mitigation for the Tennessee-Tombigbee Waterway (TTW) was authorized by the Water Resources Development Act of 1986 (P.L. 99-662, dated 17 November 1986). The Water Resources Development Act of 1986 (WRDA of 1986), like the Chief of Engineers Report dated 31 August 1985, contains three mitigation components: (1) management of existing TTW project lands; (2) more intensive manage of public lands at five nearby Corps projects; and (3) acquisition and management of separable mitigation lands. There is a significant difference between the WRDA of 1986 and the Chief of Engineers Report concerning the quantity of separable mitigation land. The act authorized the acquisition of 88,000 acres of separable mitigation land (predominantly flood plain forest) from willing sellers. The act specifies that not less than 20,000 acres shall be acquired in the area of the Mobile-Tensaw River Delta, Alabama, and not less than 25,000 acres in the area of the Pascagoula River, Pearl River, and the Mississippi River Delta, Mississippi. Other lands may be acquired anywhere in the States of Alabama and Mississippi. The states of Alabama and Mississippi shall provide for the management of the designated Corps project lands and separable mitigation lands, subject to available funding. They shall be reimbursed by the Corps for such management and initial development. The plan for management of wildlife mitigation lands will be developed jointly by the Corps, the Fish and Wildlife Service, and the states of Alabama and Mississippi. Scheduled completion date was September 1999. The total project cost is estimated to be \$90,901,386.

Tombigbee River-East Fork (Mobile District)

A project to alleviate flooding in Itawamba County by clearing, removing drift jams, and excavating cutoffs along 53 miles of the Tombigbee River (then known as the Fast Fork), from the junction of Big Browns and Mackeys Creeks to the Monroe county line, was authorized in 1936 and completed in 1940. The project was modified in 1941 to extend the improvement downstream to the Noxubee River in Alabama. Bank and channel clearing was also completed along the stream in Monroe County. The Corps maintains the portion of the channel in Itawamba County, and local interests maintain the remainder of the project.

Five of the creeks included in the flood control project for the Tombigbee River tributaries currently under construction (Big Brown, Donivan, Twenty- mile, Mantachie, and Stanifer) empty into the East Fork section of the Tombigbee River. When these creeks were improved, it became essential that the river channel be kept open to allow unimpeded runoff of the floodwaters.

Since the stream and streambank had reverted to a high-quality fish and wildlife habitat, special measures are being taken to protect these resources. Snagging and limited

clearing operations are performed in a manner which causes a minimum of environmental damage while still providing a fully functional flood control project.

Maintenance in Monroe County is being performed by the Tombigbee River Valley Water Management District, the local sponsor. Total federal cost of the existing project as of September 1999 was \$134,801 for new work and \$3,980,808 for maintenance.

Tombigbee River Tributaries Above Demopolis ***(Mobile District)***

In 1958 Congress authorized channel clearing and modifications on 22 tributary streams of the upper Tombigbee River to alleviate flooding in six counties in northwest Alabama and nine counties in Mississippi. The project provided for improving about 466 miles of these streams by channel clearing and enlargement. Channel development has been completed on six streams: Big Brown, Donivan, Twentymile (Mile 0-Mile 11.7), Mantachie, James and Stanifer Creeks. Improvements on Sipsey, Noxubee and Buttahatchie Rivers, Little Browns Creek and the Tibbee River Basin are in the inactive or deferred category. Construction of the remaining portion of Twentymile Creek (Mile 11.7 - Mile 22) is under way and planning is under way on the remaining segment of Luxapalila Creek.

The present plan provides for channel improvement on 69 miles of streams. The first segment of the improvement of Luxapalila Creek in Lowndes County, Mississippi, was completed in 1974. A contract for a channel extending into Alabama was stopped by the courts in 1975. An environmentally sustainable project was developed and the court order was lifted in 1984.

Luxapalila Creek is the only remaining work scheduled to be accomplished. Plans and specifications for the channel contract are complete. The clearing and snagging contract was awarded in June 1994. All work is scheduled for completion by September 2000. Total federal cost as of September 1999 was \$39,239,787 for new work and contributed funds total \$554,391.

Wolf Creek ***(Mobile District)***

A project to provide streambank erosion protection at Highway 362 bridge over Wolf Creek, Prentiss County, was authorized under Section 14, Flood Control Act of 1946, as amended. The project consists of riprap protection extending from approximately 130 feet upstream to approximately 120 feet downstream of the bridge. A low stone weir was constructed approximately 10 feet downstream of the bridge to provide a backwater effect and encourage deposition upstream. Construction was completed in 1983. Total construction cost to date is \$114,753.

Wolf Creek, U.S. Highway 45 Bridge ***(Mobile District)***

The U.S. Highway 45 bridge is located in Prentiss County, approximately 75 miles north of Columbus, Mississippi. The U.S. Highway 45 bridge crosses Wolf Creek at Mile 0.9 above the mouth of the creek.

The project provides for slope protection under the U.S. Highway 45 bridge. The banks were 6 inches of bedding material and filter fabric. Three-foot-high weirs were placed just downstream from the bridge to provide a backwater effect, and section riprap at the weir was grouted. Local cooperation requirements were applied and the project was turned over to the local sponsor to maintain. The project was essentially completed in 1984 at a total cost of \$154,641.

Studies

Tennessee-Tombigbee Corridor Study ***(Mobile District)***

The Tennessee-Tombigbee Corridor Study combines three Congressional authorizations directing the Corps to provide a plan for development, conservation and utilization of water and related land resources, giving consideration also to economic and human resource development. Two public access computer systems were developed to deliver portions of the comprehensive study data. Both systems provide the user with information needed to determine whether or not the growth of the project will be beneficial. A total of 51 counties are included in the study area, 14 of which are in Mississippi. The study, which was initiated in 1977, formally concluded in 1986. Its products live on, however, in the hands of local- and state-level users. There are 33 official users at specific planning offices, universities, and agencies, which serve the entire 51-county area. Although the development of the product is complete, the Corps maintains the data and still provides technical assistance in the use and application of the individual reports and computer systems.

Tombigbee River Basin, Joint Study ***(Mobile District)***

Authorized by Congress, this study directs the Corps of Engineers and the Soil Conservation Service to conduct joint studies of the Tombigbee River Basin. The purpose of the study is to develop a water resources plan to solve problems and needs within the basin such as flooding, soil and streambank erosion, siltation, water quality, water supply, recreation, fish and wildlife, environmental quality and other allied purposes. The results of the study will provide a guide for development to meet the immediate and long-range water resources needs. The study was initiated in 1985 and completed in 1990. However, the report is not being processed through normal review channels to congress. The

authority for the study will remain open until the completion of the East Fork Tombigbee Basin study.

East Fork
(Mobile District)

The East Fork Basin Study combines 1939 and 1984 congressional authorizations. The study will address environmental construction measures to control erosion and sedimentation from tributaries and farm land, restoring aquatic habitats and endermic walleye fish populations damaged by streambed and streambank erosion, reducing shoaling in Aberdeen Lake navigation channel, and preventing further timber damage and land loss.

Flood Plain Management

Hull Branch
(Mobile District)

A Special Flood Hazard Evaluation was performed at Hull Branch in Kemper County. Findings were published in 1984.

Buttahatchie River
(Mobile District)

An investigation of flooding conditions on Buttahatchie River, Mississippi and Alabama, was performed, and a flood information report was published in 1981.

Luxapalila Creek
(Mobile District)

Flood hazard report on residential, agricultural, and woodland areas subject to flooding by Luxapalila Creek at Columbus, Mississippi. Report published in 1970.

Tombigbee River and Lower Town Creek
(Mobile District)

Flood hazard report on Tombigbee River, Aberdeen to Amory, Mississippi, and Lower Town Creek. Types of lands studied in flood-prone areas consisted of residential, commercial, agricultural, and woodlands. Report published in 1972.

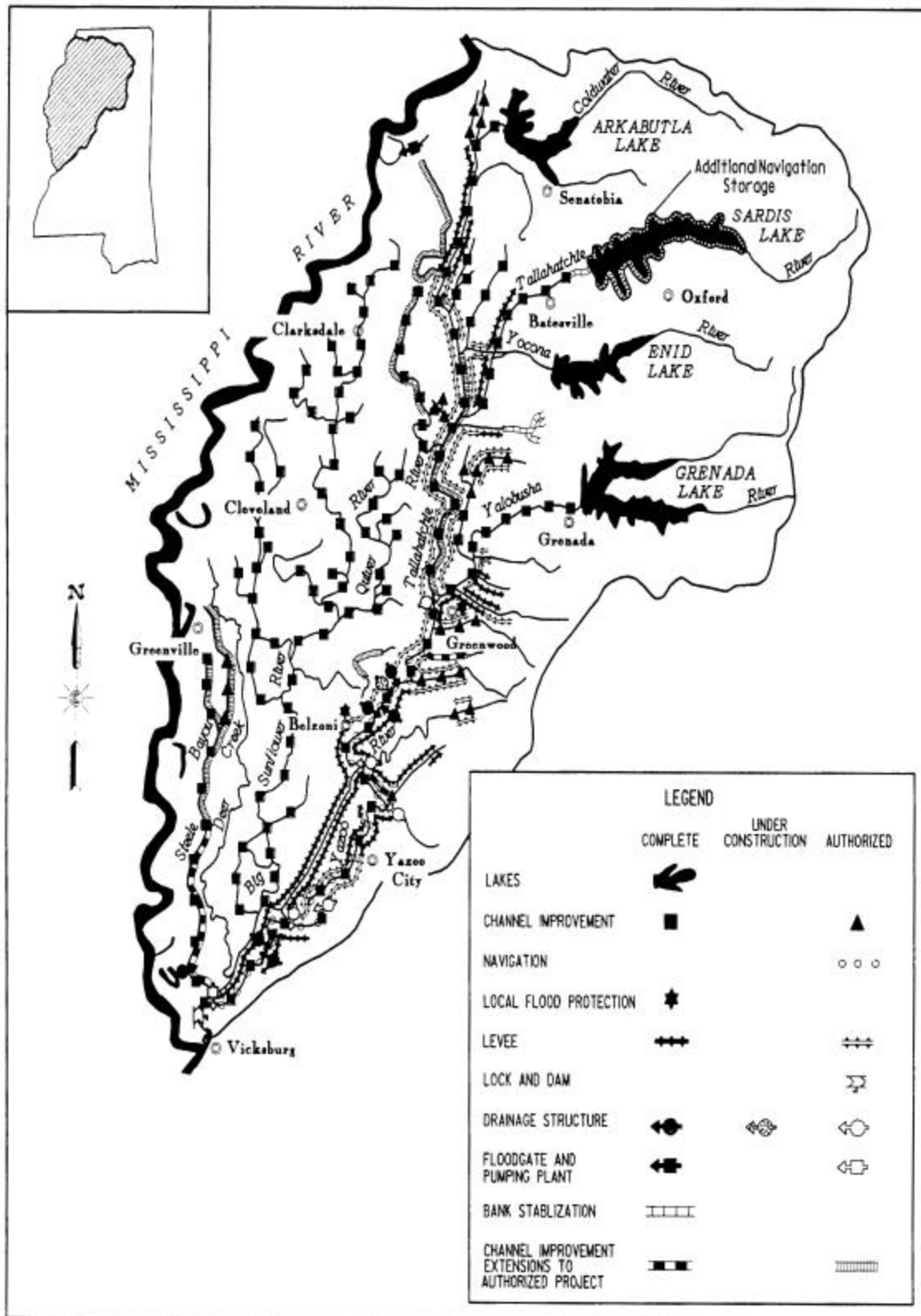
**Tombigbee River and
Tributaries at Columbus**
(Mobile District)

Residential, Commercial, and agricultural lands identified as being in flood-prone areas at Columbus, Mississippi, on the Tombigbee River and tributaries. Report published in 1965.

Twentymile, Wolf, and Osborne Creeks
(Mobile District)

Flood hazard report on rural agricultural lands in flood-prone area on Twentymile, Wolf, and Osborne Creeks in Prentiss County in vicinity of Booneville, Mississippi. Report published in 1975.

Yazoo River Basin



Yazoo River Basin

The Yazoo River Basin occupies approximately the northwest quarter of the State of Mississippi. The basin extends from the Chickasaw Bluffs south of Memphis, Tennessee, to the Walnut Hills at Vicksburg, Mississippi, a distance of about 200 miles. The basin is only a few miles wide at the extreme northern and southern ends, but gradually widens to about 100 miles near the center.

The western boundary of the basin is formed by the Mississippi River east bank levee to the vicinity of Vicksburg, where the boundary becomes the east top bank of the Mississippi River. The basin is bordered on the north by the divides of the Hatchie and Chickasaw River Basins. The eastern and southern boundaries, respectively, are formed by the divides of the Tombigbee and Big Black River basins.

The Yazoo River Basin consists of two distinct areas, the Delta and hill sections. The Delta section lies in the alluvial valley of the Mississippi River and occupies the western half of the basin. The terrain of the Delta is very flat, with an average slope from north to south of 0.5 feet per mile. The hill section lies in the eastern half of the basin and has a topography, which varies from gently rolling to rugged hills. Elevations in the hill section range from 100 feet, NGVD (near Yazoo City), to over 600 feet, NGVD, near the northeast corner of the basin.

The principal hill tributaries - Coldwater, Little Tallahatchie, Yocona, and Yalobusha Rivers - begin in north- central Mississippi, then flow southwestward to form the main stem of the Yazoo, Tallahatchie, and Cold- water River system. A major portion of the Yazoo River Basin's stream flow originates in the hill tributaries. The principal alluvial valley streams are the Big Sunflower River, Steele Bayou, and the Yazoo and Tallahatchie Rivers.

The economy of the Yazoo River Basin is based primarily on agricultural activities. Lands used for agricultural crops, pastures, and forests constitute 82 percent of the total lands. Major crops produced include cotton, soybeans, rice, corn, and small grains. Lumber and pulpwood are the primary forest products and catfish are produced. The main manufacturing industries in the basin include lumber and furniture, textile mills, apparel and other textile industries, and machinery industries. Principal urban centers are Greenville, Vicksburg, Greenwood, and Clarksdale.

Drainage problems are complex with high runoff from streams in the hill area resulting in or adding to flood problems in the Delta. Large parts of the Delta are subject to both headwater and backwater flooding from the Mississippi and Yazoo Rivers.

Water resources development in the Yazoo River Basin consists primarily of three projects - the Yazoo Headwater, Big Sunflower River, and Yazoo Backwater Projects. Major improvements in the headwater area consist of four large lakes (Arkabutla, Sardis, Enid, and Grenada) on the four principal hill tributaries, channel improvements, levee construction, the Upper Yazoo Projects, and the lower auxiliary channel. Flooding in the

Delta is reduced by extensive channel improvements on the Big Sunflower River, Steele Bayou, and their tributaries. When complete, the Yazoo Backwater Project, with its levees, connecting channels, and floodgates, will provide protection from backwater flooding from the Mississippi and Yazoo Rivers to the lower Yazoo delta area. In addition to these projects, a navigation project is authorized for the Yazoo River from its mouth to Greenwood.

Projects

Big Sunflower River, Etc. *(Vicksburg District)*

The Big Sunflower River and Steele Bayou and their tributaries drain a major portion of the Yazoo River Basin delta area and enter the Yazoo River in its lower section. The project area extends from about 15 miles north of Clarksdale to the confluence of Big Sunflower River, Deer Creek, and Steele Bayou with the Yazoo River, just north of Vicksburg. It is bordered on the west by the east bank levee of the Mississippi River. The eastern border is the drainage boundaries of the Coldwater and Tallahatchie Rivers, the Yazoo River, and the lower auxiliary channel. In general, the Delta area included in the project area is characterized by broad expanses of relatively flat to gently rolling land, comprised largely of fertile bottomland soils. Major tributaries of the Big Sunflower River include the Bogue Phalia, Quiver River, and Hushpuckena River. Congressional authorization provided for channel improvement for flood control on Big Sunflower River, Hull Brake-Mill Creek Canal, and Hushpuckena and Quiver Rivers and their tributaries.

The purpose of the project is to provide flood control and afford adequate outlet drainage for the tributary lands. Channel improvement work on the Big Sunflower River and its tributaries protects 195,000 acres against the project design flood; an additional 395,000 acres are benefited by improved drainage conditions. Further authorization in 1965 provided for water control structures in nine lakes as fish and wildlife conservation features.

Channel improvements constructed on the Big Sunflower River and its tributaries and Steele Bayou are discussed in the following paragraphs:

Big Sunflower River. Approximately 194 miles of the Big Sunflower and 22 miles of the Little Sunflower River have been improved. Channel improvement, completed in 1962-1963, included enlargement, clearing and snagging. Improvements were also made to small tributaries of the Big Sunflower River. Major maintenance is now required for the lower 130 miles of the Big Sunflower and Little Sunflower rivers.

Bogue Phalia. Channel clearing and snagging improvements were completed on Bogue Phalia in 1963. Work was also done on tributaries of the Bogue Phalia. Major maintenance is now required for that portion of the Bogue Phalia south of U.S. Highway 82.

Hushpuckena River. The Hushpuckena River has been improved from its mouth to near Mile 28. Improvements, completed in 1964, included channel enlargement, clearing and snagging.

Quiver River. Channel improvements (enlargement, clearing and snagging) were completed on the Quiver River and its tributaries in 1966.

Steele Bayou. About 100 miles of channel improvement on Steele Bayou and Main Canal have been completed. The work on Steele Bayou was completed in 1954, and the portion on Main Canal was completed in 1959. Improvements authorized on Black Bayou were not done, with the exception of clearing and snagging on the lower reach.

Additional improvements on Steele Bayou, Black Bayou, and Main Canal have also been authorized. These improvements provide greater channel capacities for these streams. Currently, improvements on Steele Bayou are complete to Mile 68.7. Studies made in 1963 resulted in recommendations for modifying the authorized project to provide still further improvements above Mile 52.5 on Steele Bayou, the lower 22.2 miles of Main Canal and on Black Bayou, plus extending channel improvements on Black Bayou from Mile 18.5 to 36.5. These modifications were authorized in 1970.

Modifications to the original project have resulted from a need to provide additional flood protection in the upper Steele Bayou Basin to reduce flood damages in the Greenville, Mississippi, area and the rich farmlands along Main Canal, Black Bayou, and the upper 15 miles of Steele Bayou. Also, there exists a need to preserve fish and wildlife habitat in Swan Lake.

A report approved in 1978 presented the results of studies made to reaffirm the currently authorized plan. Improvements included in the modified project consist of channel enlargement on Steele Bayou, Black Bayou, and Main Canal, plus channel work and construction of levees and water control structures in the Swan Lake area; a closure fill with gated culvert on Main Canal at Mile 27.2; weirs in Black Bayou, Main Canal, and Steele Bayou; and replacement of the weir in Fish Lake.

Work on these modifications has been completed to the lower end of Swan Lake at Mile 68.7. Phase III of five phases is almost complete on Item 66A and 66B. Also work has begun on Black Bayou Item 2. The total cost of the projects is estimated at \$129 million. Flood damages prevented by this project amount to \$220.6 million through 1994.

Lead Bayou, Bolivar
and Sunflower Counties
(Vicksburg District)

Authorized under Section 205 of the Flood Control Act of 1948, as amended, the project consists of channel improvement on 9.7 miles of Lead Bayou and its tributary (West Main Canal) to alleviate flooding in the urban area of Cleveland, Mississippi, and

agricultural lands along the channels. Construction began in 1982 and was completed in 1985.

**Porter Bayou, Bolivar
and Sunflower Counties**
(Vicksburg District)

To reduce flooding in the area of Shaw, Mississippi, and agricultural lands along the channel, this project was authorized under Section 205 of the Flood Control Act of 1948, as amended. The project consists of channel improvement on approximately 10 miles of channel above Mile 12.5 on Porter Bayou. Construction, which began in 1982, was completed in 1983 with the exception of a short reach containing a growth of aquatic weed that was successfully treated with herbicide.

**Streambank Erosion Control Evaluation
and Demonstration (Bank Stabilization)**
(Vicksburg District)

This program, authorized in 1974, was a pilot program to provide for various types of bank stabilization in the Yazoo Basin and to evaluate the cause and effect of stream bank erosion. All construction was completed in 1981. The cost of the Stream bank Erosion Control Evaluation and Demonstration Project was limited to \$14.9 million.

Demonstration Erosion Control (DEC) Project
(Vicksburg District)

The Demonstration Erosion Control Project (DEC) was initiated through legislation in 1984 to combat the continuing flooding, erosion, and sedimentation problems in the Yazoo Basin. The project is a joint effort by the Corps of Engineers and the National Resource Conservation Service with technical assistance from the U.S. Department of Agriculture Sedimentation Laboratory at Oxford, Mississippi, and the Waterways Experiment Station at Vicksburg, Mississippi. The Project is designed to demonstrate, on a watershed basis, methods of reducing the above-mentioned problems in selected watersheds. Protective measures include major and minor grade control structures, streambank stabilization, floodwater-retarding structures, land treatment, and channel improvement. The solutions developed will have wide spread application outside the Yazoo Basin.

Yazoo Backwater Project
(Vicksburg District)

The Yazoo Backwater Project was authorized in 1941. The purpose of the project is to provide protection from the backwater flooding by the Mississippi River to the large agricultural area and many small communities in the lower Yazoo Delta.

The Yazoo Backwater Area is that area of west central Mississippi, lying between the Mississippi River east bank levee and the hills, which was subject to flooding from the Mississippi River through the opening between the end of the main-line Mississippi River levee and the hills just north of Vicksburg. This triangular-shaped area extends northward some 60 miles to the latitude of Hollandale and Belzoni, Mississippi, and comprises about 1,550 square miles.

The authorization provided for the extension of the Mississippi River east bank levee generally along the west bank of the Yazoo River to a connection with the Will M. Whittington (Lower) Auxiliary Channel levee in the vicinity of the mouth of the Big Sunflower River. The works of improvement consist of levee and floodgate systems to provide flood protection to four subareas of the Yazoo Backwater Area (Yazoo, Satartia, Rocky Bayou, and Carter). Pumping facilities were also authorized for construction in the Yazoo Area, when and if they are shown to be economically feasible.

In the Yazoo area, about 28 miles of levee, 24 miles of channel work, two major drainage structures, and two river closures are complete. Improvements constructed in the Yazoo Area are now operational. Studies to establish the feasibility of pumps for the Yazoo area (Yazoo Backwater Pump Study) have been completed, and the Reevaluation Report and Environmental Impact Statement were approved on 7 July 1983.

A design memorandum for this feature was completed in 1985 and supplemented in 1987 proposing a 10,000-cubic feet per second capacity pumping plant located approximately 1 mile west of the existing Steele Bayou Drainage Structure. Construction of the inlet and outlet channels for the pumping plant was completed in October 1987. Current Status: There is no ongoing work on this separable element; however, under the reformulation study, several alternatives for providing additional flood protection in the Yazoo Backwater Area are being analyzed, including pumping stations, levees along the Sunflower River, a nonstructural plan and combination of structural/nonstructural plans. The final report is scheduled to be completed in FY 01. Authorized work in the Satartia Area consists of 20 miles of levee and one major drainage structure. Work on these items is complete.

Authorized improvements in the Rocky Bayou Area consist of about 19 miles of levee and one major drainage structure. Levee Item 1 is the reach along O'Neil Creek and includes the area where a portion of the local interest levee was destroyed by floods. This item was separated into two construction contracts. Item 1A, a 3.0-mile levee item, was awarded 25 March 1985 and is complete. Item 1B for 0.7 mile of levee and a small drainage structure was awarded on 12 November 1986 and is essentially complete. No additional construction items are currently scheduled.

Improvements authorized for the Carter Area consist of about 29 miles of levee and one major drainage structure. No construction work has been initiated.

Several features for the conservation of fish and wildlife resources were also authorized. Construction of the Muddy Bayou (Eagle Lake) Control Structure was approved in 1970

as a modification of the plan for the Yazoo Backwater feature of the Mississippi River and Tributaries Project. This structure, completed in 1977, controls the interchange of water between Eagle Lake and Steele Bayou to preserve fish and wildlife resources in the lake.

A report entitled "Yazoo Backwater Area Fish and Wildlife Mitigation Plan" dated July 1976 and approved by the Chief of Engineers on 3 December 1976, authorized construction of nine greentree reservoirs and nine slough control structures in the Delta National Forest. Installation of these features would partially mitigate the fish and wildlife losses caused by the Yazoo Backwater Project. Four greentree reservoirs and five slough control structures have been completed. Four slough control structures were deleted due to excessive costs.

A supplemental mitigation report prepared in 1989 recommended the purchase of 8,400 acres of cleared farmland to be reforested for terrestrial wildlife habitat. In the summer of 1990, a tract of land containing 8,800 acres, known as the Lake George property, was purchased by the Vicksburg District. It is located in Yazoo County between the Delta National Forest and the Panther Swamp National Wildlife Refuge. Reforestation began in 1991 and completed in 1997. Construction of the Muddy Bayou structure and greentree and slough control structures along with the Lake George wetlands restoration project have mitigated the impacts of the completed features of the Backwater Project.

The total cost of the Yazoo Backwater Project is estimated at \$400 million. Flood damages prevented by this project through 1999 amount to \$87.5 million.

Yazoo Headwater Project ***(Vicksburg District)***

Drainage in the headwater area of the Yazoo Basin is complex, and flooding presents a serious problem. During early settlement, floodwaters were combated by the use of levees to confine flows in the Yazoo. However, these measures proved to be inadequate against even minor headwater floods.

Major flooding is caused by runoff from the hill area, which is drained largely by four main tributaries. Any plan to control flooding must include a plan to control the flood flows of these hill tributaries. The character of these hill tributaries complicates the problem. Each stream has a high rate of runoff with some streams carrying tremendous amounts of sand and silt downstream causing extensive damage to farmland, choking drainage channels, and damaging the main drainage outlets. Big Sand Creek, near Greenwood, Mississippi, causes very serious siltation problems, and Potacocowa Creek and other hill tributaries cause similar problems.

Congressional authorization in 1928 provided the first means to combat the complex flooding problems of the headwater area. Under this authority, the Yazoo Headwater Project provided for construction of four large dams in the hill area, one on each of the four principal tributaries of the Yazoo River System, with such channel improvement

works, levees, auxiliary channels, and other drainage works as necessary to provide protection from headwater floods of the Yazoo River System. Other authorizations provided features for the preservation of fish and wildlife resources.

Although the primary function of the four lakes in the headwater area is flood control, they also provide many and varied recreational opportunities. Periodically, master plans are updated for the lakes to determine needs for additional or improved recreational facilities.

The Yazoo Headwater Project will protect 1,209,000 acres against flooding, partially protect 303,000 additional acres, and provide flood protection to the cities of Greenwood, Yazoo City, Belzoni, and numerous smaller communities. The total cost of the Yazoo Headwater Project is estimated at \$1.2 billion. Flood damages prevented by this project amounted to \$1.7 billion through 1999. Major features of the Yazoo Headwater Project are discussed below.

Arkabutla Lake

The lake was constructed as a part of the overall comprehensive plan for flood control in the Yazoo River Basin and is one of the major features of the Yazoo Headwater Project. Arkabutla Dam was completed in 1943 and is located northwest of Coldwater, Mississippi, on the Coldwater River in Tate and DeSoto Counties. The purpose of this project is to reduce flood flows downstream so that the outflows can be carried in the channels and between the levees. The lake area provides for fish and wildlife conservation and for recreation opportunities; storage in the lake also provides low flow augmentation for agricultural purposes and incidental navigation.

Arkabutla Dam is of the earth-fill type, 11,500 feet in length, and stands an average of 67 feet above the streambed. The outlet structure located near the south abutment provides a means of regulating out-flow of lake storage in order to obtain maximum flood control benefits along down-stream channels. The spillway, located in the north abutment, is of the uncontrolled chute-type and is 300 feet in width. The spillway protects the dam from overtopping. When filled to spillway crest (elevation 238.3 feet, NGVD), Arkabutla Lake extends up the Coldwater River Valley a distance of 16 miles with a surface area of 33,400 acres and a shoreline of 255 miles.

At minimum or conservation pool elevation (209.3 feet, NGVD), the lake extends upstream for a distance of 7 miles with a surface area of 5,100 acres and has a 70-mile shoreline. The lake and adjoining project lands provide excellent opportunities for many types of recreation. Recreation facilities provided by the Corps at Arkabutla include boat-launching ramps, picnic areas, swimming beach, campgrounds, drinking water, restrooms, access roads and parking areas. Leases to groups such as the Delta Sailing Club provide areas for other types of recreation.

Needs for additional recreational facilities are examined periodically, and facilities will be expanded and improved as public use demands. Visitors to Arkabutla in 1994

numbered 1.3 million. The management of fish and wildlife resources is being directed by the Mississippi Department of Wildlife Conservation.

Enid Lake

This lake is another of the major features of the Yazoo Headwater Project. Enid Dam, completed in 1955, is located about 26 miles north of Grenada, Mississippi, just northeast of Enid, Mississippi, on the Yocona River. Enid Dam was built to reduce floodflows downstream so that the outflows can be carried in the channels and between the levees. The lake area provides for the conservation of fish and wildlife resources and opportunities for recreation, and the lake storage provides low flow augmentation for agricultural purposes and incidental navigation.

The earthfill dam is 8,400 feet in length and stands an average of 85 feet above the streambed. Regulated outflow of lake storage is provided by the outlet structure, which is located near the north abutment of the dam. The spillway, located in the north abutment, is 200 feet in width and protects the dam from overtopping. When filled to spillway crest (elevation 268.0, NGVD), the lake extends up the Yocona River Valley a distance of over 18 miles, with a surface area of 28,000 acres and a shoreline of 220 miles. With the lake at conservation or minimum pool elevation (230.0 feet, NGVD), a pool area of 6,100 acres is formed which extends up the valley for 8 miles and has a shoreline of 65 miles.

Excellent recreation opportunities are available at Enid Lake and on project lands adjacent to the lake. Recreation facilities provided by the Corps of Engineers include public boat-launching ramps, campgrounds, picnic areas, drinking water, restrooms, swimming beaches, and access roads and parking areas. Commercial lessees adjacent to Enid Lake provide additional facilities and services. Facilities at the George Payne Cossar State Park, operated by the Mississippi Department of Natural Resources, consist of campgrounds, boat-launching ramps, picnic areas, restrooms, a snack bar, drinking water, and camping pads with electrical hookups.

Needs for additional recreation facilities are examined periodically, and facilities will be expanded and improved as public use demands. Visitors to the lake numbered .8 million in 1994. The fish and wildlife resources management at Enid Lake is directed by the Mississippi Department of Wildlife Conservation.

Grenada Lake

The lake was completed in 1955 and is located northeast of Grenada, Mississippi, on the Yalobusha River. This project was also constructed as a part of the overall comprehensive plan for flood control and is another major feature of the Yazoo Headwater Project. Constructed as a means of reducing flood flows downstream so that the outflows can be carried in the channels and between the levees, the project also provides for the conservation of fish and wildlife resources and for recreation opportunities. The lake storage capability provides low flow augmentation for agricultural purposes and incidental navigation.

Standing an average of 80 feet above the streambed, Grenada Dam, an earthfill-type dam, is 13,000 feet long. The outlet structure, located near the south abutment of the dam, provides a means of regulating outflow of lake storage in order to obtain maximum flood control benefits along downstream channels. The spillway, located in the south abutment, is of the uncontrolled chute-type and is 200 feet in width. The spillway protects the dam from overtopping.

Grenada Lake is Y-shaped and when filled to spillway crest (elevation 231.0 feet, NGVD) extends up the Yalobusha River Valley a distance of 22 miles and up the Skuna River Valley a distance of 19 miles. At this elevation, the lake has a surface area of 64,600 acres and a shoreline of 282 miles. At the minimum or conservation pool elevation (193.0 feet, NGVD), the surface area is 9,800 acres, the shoreline is 54 miles, and the lake extends 7 miles upstream from the dam.

Grenada Lake and the adjoining project lands provide excellent opportunities for many types of recreation. Recreation facilities provided for the public by the Corps include picnic areas, campgrounds, boat-launching ramps, and trails. In addition, access roads, parking facilities, drinking water, restrooms, and interpretive signs have been provided. A favorite attraction at Grenada Lake is the Civil War redoubt, which has been restored to its original condition and is used in the summer in a reenactment of Civil War history presented by authentically uniformed soldiers.

The office/visitor center includes ranger and manager office space, an auditorium equipped with "wraparound-sound," combination science and history exhibits, and an observation deck to offer a view of the lake near the dam.

Commercial lessees adjacent to Grenada Lake provide additional facilities and services. Leases to the Mississippi Department of Natural Resources, Girl Scouts, Future Farmers of America, and the Wildlife League provide areas for other types of recreation. The Department of Natural Resources operates two state parks at Grenada - the Hugh White and Carver Point State Parks. Facilities at these state parks consist of public picnic areas, campgrounds, boat-launching ramps, overnight cabins, a lodge, trailer park, swimming areas, rental boats, tackle and bait, and public drinking water.

Needs for additional recreation facilities are examined periodically, and facilities will be expanded and improved as public use demands. Visitors at Grenada Lake in 1994 numbered 2.1 million.

The management of the fish and wildlife resources is being directed by the Mississippi Department of Wildlife Conservation.

Sardis Lake

The lake controls a drainage area of 1,545 square miles and was constructed as a part of the overall comprehensive plan for flood control in the Yazoo River Basin. Sardis Dam,

completed in 1942, is located on the Little Tallahatchie River northeast of Batesville, Mississippi. The purpose of this project is to reduce flood flows downstream. The lake formed by the dam also provides for water-oriented recreation opportunities and conservation of fish and wildlife; the lake storage provides for low flow augmentation for agricultural purposes and incidental navigation.

Sardis Dam is of the hydraulic earth-fill type, is 15,300 feet in length, and has an average height of 97 feet above the streambed. At spillway crest (elevation 281.4 feet, NGVD) Sardis Lake extends up the Little Tallahatchie River Valley a distance of over 30 miles with a surface area of about 58,500 acres and a shoreline of 370 miles. A minimum or conservation pool (elevation 236.0 feet, NGVD) creates a lake covering 10,700 acres, extending up the valley about 10 miles, and having a shoreline of 60 miles. The outlet structure, located in the south abutment, provides a means of regulating outflow of lake storage in order to obtain maximum flood control benefits along downstream channels. The uncontrolled chute-type spillway, in the north abutment, protects the dam from overtopping.

On lands adjacent to Sardis Lake, the Corps of Engineers has provided picnic areas, outdoor fireplaces, drinking water, restrooms, beach areas, camping areas, amphitheater, nature and motorcycle trails, access roads and parking areas, and boat-launching ramps for public use. Commercial lessees adjacent to Sardis Lake provide additional facilities and services such as restaurants, boat storage, boat and motor rental, tackle, bait, and other necessities. Leases to the Department of Natural Resources, Girl Scouts, Boys Club, 4-H Club, and Mississippi State University provide areas for other types of recreation, including group camping and fishing. Facilities at the John W. Kyle State Park, located near the spillway, consist of cabins, two dormitories for group use, recreation hall, swimming pool, lodge, beach area and bathhouse, picnic area, tent and trailer campground, restrooms, drinking water, boat-launching ramp, and other facilities.

Periodically, needs for additional recreation facilities are examined, and facilities will be expanded and improved as public use demands. Visitation at Sardis in 1994 numbered 1.5 million.

Federal, state, and local agencies are continually at work to improve and perpetuate the fish and wildlife, soil, forests, and other important resources at Sardis Lake. Fish and wildlife resources management in the area is under the direction of the Mississippi Department of Wildlife Conservation. In fiscal year 1997 Congress directed the use of up to \$4,000,000 of Flood Control Mississippi River and Tributaries (MR&T) appropriation funds to dredge the Shady Cove area of Sardis Lake, Mississippi, at 100 percent Federal cost, so that the City of Sardis, Mississippi, may proceed with its development of Sardis Lake Consistent with language provided in House Report 104-679, accompanying the Fiscal Year 1997 Energy and Water Development Appropriations Act (Public Law 104-206).

The Corps accomplished engineering and design, and awarded a contract for construction of a containment dike and dredging on December 23, 1998. Since awarding the contract,

the Corps has concluded an additional \$3,000,000, above the original \$4,000,000 provided by Congress, is required to complete the project. The corps reprogrammed the required \$3,000,000 from within the MR&T appropriation. This additional work will result in completion of the marina dredging and construction of the containment dike in a manner that will result in improved fisheries and a more esthetically sustainable lake area. Construction is scheduled for completion in February 2001.

Channel Improvement and Levees

Improvement to Coldwater, Tallahatchie, Yalobusha, and Yazoo Rivers and their tributaries, another major feature of the Yazoo Headwater Project, consists of extensive channel improvement and levee construction in the Yazoo River System.

Coldwater River and Pompey Ditch

Improvements have been made from the mouth of the Coldwater to Arkabutla Dam. Pompey Ditch, which was completed in 1923, is a long cutoff on the Coldwater River from Prichard, Mississippi, to about Marks, Mississippi. In 1942, general channel enlargement and construction of about 30 cutoffs were completed between Arkabutla Dam and Pompey Ditch and also below Pompey Ditch. The Arkabutla Canal was constructed in 1949. In 1950, the Old Coldwater River above Crenshaw, Mississippi, was closed off and flow was diverted through Pompey Ditch. In 1941, cutoffs were completed between the Panola-Quitman Floodway and Lambert, Mississippi, on the Tallahatchie River. Dredging and channel improvements on Burrell Bayou and the lower portion of David Bayou and their tributaries were completed in 1959. Channel improvements on Cassidy Bayou and the lower part of Deep Bayou were completed in 1964. Additional improvements are to be constructed on White Oak Bayou, Lake Cormorant, the Coldwater River, and other small tributaries of the Coldwater.

Tallahatchie River and Little Tallahatchie River

Improvements have been made from below the mouth to Sardis Dam. The Little Tallahatchie River downstream from Sardis Lake flows through the Panola-Quitman Floodway, which was completed in 1924. At the upper end of the floodway, the Little Tallahatchie flows are joined by those of the Yocona River. Improvements on Cassidy Bayou, below Old Coldwater River, the Panola-Quitman Floodway, Little Tallahatchie River and Yocona River were completed. Improvements on a local levee system adjacent to the Panola-Quitman Floodway are authorized. The improvements of the west levee were completed in July 1986. In 1962, channel enlargement was completed on the Little Tallahatchie River between the mouth of Bobo Bayou and Tallahatchie River and on Bobo Bayou; channel improvements were completed on the Tallahatchie River in the vicinity of Lambert.

Additional improvements are to be constructed on the Tallahatchie River and Opossum Bayou. A diversion channel and closure and overflow structure were constructed in the Ascalmore-Tippo Bayou area, with channel and levee improvements near completion.

Emergency dredging operations on the Tallahatchie River just downstream from the confluence with Tillatoba Creek and the Panola-Quitman Floodway were completed in 1975, and additional work in this area is planned. Cleanout and construction of three grade control structures on the Little Tallahatchie River were accomplished in 1982. Clearing and snagging at selected locations were accomplished in early 1980 on the 6 miles of Little Tallahatchie River downstream of Sardis Dam. Channel maintenance from mile 226 to 235 on the Tallahatchie River was completed in 1993.

Yalobusha River

Clearing and snagging operations had been accomplished on the Yalobusha River prior to completion of the Grenada Dam. In 1942, additional clearing and snagging operations were performed on the Yalobusha River. Between 1951 and 1954, 29 cutoffs were completed on the river below the Grenada dam site to below Whaley, Mississippi. New and enlarged levees were completed along both sides of Teoc Creek, a tributary of the Yalobusha River. Several miles of levee on the left bank of the Yalobusha River, that tie to the Teoc Creek south bank levees, were completed in 1979. Maintenance of the Yalobusha River channel from mile .8 to 12.2 was completed in 1994.

Yazoo River

The channel of the Yazoo River has been improved from the mouth to the confluence of the Tallahatchie and Yalobusha Rivers. Levees have been constructed intermittently on the east bank from below Yazoo City to Marks, Mississippi. On the west bank of the Yazoo, levees were constructed from opposite Yazoo City to the head of the Lower Auxiliary Channel and from the Auxiliary Channel upstream to a local levee near Black Democrat Bayou. These levees are not complete, however, and have little or no effect on stages of the Yazoo. The greatest effect on stages in the Yazoo River resulted from the construction of the four dams on the major hill tributaries.

Between 1940 and 1943, seven cutoffs were constructed from Greenwood to Belzoni, Mississippi, on the Yazoo River. Improvement of 27 miles of Tchula Lake and construction of a floodgate at the upper end of the lake at the Yazoo River were completed in 1964. In 1973, work was completed on the Hillside Floodway, southeast of Tchula, Mississippi, to confine the flood flows of Fannegusha and Black Creeks into a floodway. The project consisted of channel work; the construction of levees, drainage structures, and ditches; and the acquisition of approximately 15,000 acres of fish and wildlife mitigation lands. The mitigation lands were released to the U.S. Fish and Wildlife Service, U.S. Department of the Interior, for management as a national wildlife refuge. Additional improvements are to be constructed on several tributaries of the Yazoo River.

Fish and Wildlife Features

The Yazoo Headwater Project fish and wildlife features include the land, fish, and wildlife developments (including a water control structure) in connection with the

Hillside Floodway, a water control structure in connection with the lower auxiliary channel, and a water control structure in the Old Techeva Creek and McIntyre Lake area.

Local Protection (Greenwood, Belzoni, and Yazoo City)

Local protection works of improvement have been constructed for Greenwood, Belzoni, and Yazoo City, Mississippi, as features of the Yazoo Headwater Project.

Levees, the Walker Lake Canal, and the Walker Lake Pumping Plant have been constructed near Greenwood, Mississippi, for local protection. The local protection project for Greenwood also included a floodwall, drainage structures, relocation of levees along Palusha Bayou, a sewage pumping station, and a waste stabilization pond. These works of improvement protect Greenwood and North Greenwood from headwater flooding by the Yazoo, Tallahatchie, and Yalobusha Rivers.

Just northeast of Greenwood, a diversion channel and appurtenant levees have been constructed to divert the flows of Big Sand Creek into the Yalobusha River. The project was completed in 1973. Construction is complete on an extension of the existing Big Sand Creek levees to the hill line. Construction consisting of raising a portion of the levee south of the creek has been authorized to increase the level of protection for a developing area of Greenwood, Mississippi. All the levee and channel construction for Pelucia Creek is complete.

The Belzoni Protection Works, completed in 1959, consist of a levee, a floodwall, and appurtenant drainage structures, which provide protection from the Yazoo River floodwaters.

Improvements to protect Yazoo City from Yazoo River floodwaters were completed in 1956 and consist of two channel cutoffs, levees on each side of the new channels, drainage structures (including pumping plant), and alteration and extension of the sanitary sewer.

Main Stem Feature. The main stem feature in the Yazoo Basin consists of new and enlarged levee improvements along the Yazoo, Tallahatchie, and Coldwater Rivers from Yazoo City to Pritchard, Mississippi, and channel clearing, cutoffs, and channel enlargements along the Yazoo, Tallahatchie, and Coldwater Rivers from Yazoo City to Arkabutla Lake. The authorized work provides protection to adjacent areas against floods. The work includes closure of gaps in the completed Yazoo River levee system. Drainage structures have been completed at Snake Creek, Wasp Lake, and Bee Lake outlets to the Yazoo River.

Upper Yazoo Projects

This project, formerly referred to as the upper auxiliary channel, is located in or affects portions of 12 counties in the Yazoo Basin. The project will handle the drainage from

8,900 square miles - 2,300 square miles in the delta and 6,600 square miles in the hill area. The major benefits of the project will occur in the Delta Area.

The Upper Yazoo Projects plan provides for additional flood control to the affected area by enlargement of the existing Coldwater-Tallahatchie- Yazoo River System. It also includes the needed levee system along the portions of the main stem river that currently have no, or inadequate, levee protection. The project includes 197 miles of channel modification on the Yazoo-Tallahatchie- Coldwater Rivers, 26 miles of levee with appurtenant drainage structures, and a structure at the head of Tchula Lake to divert flow from the Yazoo River through Tchula Lake.

This project will prevent 64 percent of the annual flood damages occurring in the affected area. With this project in operation, 1,136,000 total acres will receive varying levels of flood protection. Construction of Upper Yazoo projects was initiated in 1976 and is continuing with completion scheduled for year 2013. Approximately 76 miles of channel enlargement on the Yazoo River, extending from Yazoo City to Sidon, Mississippi, about 35 miles upstream of Belzoni have been completed. Construction of channel enlargement and levee construction just downstream of Greenwood, Mississippi, is continuing. Estimated cost of this project is \$339 million.

Will M. Whittington (Lower) Auxiliary Channel

In addition to the dams, local protection, and channel and levee improvements, the Will M. Whittington (Lower) Auxiliary Channel was constructed in 1962 as a major feature of the overall Yazoo Headwater Project. The channel, with its parallel levees and landside drainage ditches, is designed to allow a major portion of the floodflow in the Yazoo River near Silver City, Mississippi, to pass down and reenter the Yazoo River near the mouth of the Big Sunflower River. By splitting the flows of the Yazoo River, the lower auxiliary channel provides for reductions in flood stages on part of the Yazoo River.

Yazoo Basin Reformulation *(Vicksburg District)*

A study of the remaining unconstructed features in the basin began with the Upper Steele Bayou Project and the Upper Yazoo Projects in 1989.

The reformulation includes a thorough analysis reasonable arrays of engineering, economic, and environmental aspects of project alternatives. As a part of this effort, new land-use surveys, mapping, real estate and other information are being secured with particular emphasis on environmental data. In addition, a complete and comprehensive technical design review is being conducted. Environmental design will be incorporated into as many project features as possible, thereby reducing fish and wildlife mitigation requirements. Environmental losses which cannot be offset via design will be compensated for by formulation of appropriate mitigation measures.

The final report for the Upper Steel Bayou Projects and Upper Yazoo was completed in 1992 and 1993, respectively. Reformulation of the Yazoo Backwater Project was initiated in 1993. The reformulation study is being focused on the Yazoo Area and the authorized pumping plant at Steele Bayou. The purpose of the study is to determine the best plan to address the remaining flood control and environmental needs based on current engineering, socioeconomic and environmental data.

Reformulation of the Tributaries portion was initiated in 1994. Features to be evaluated include Yalobusha River, Oppossum Bayou, Potacocowa Creek, Tillatoba Creek, Lake Cormorant Bayou, Hurricane Bayou, Rocky Bayou, Witeoak Bayou, Cassidy Bayou and some miscellaneous ditches. Evaluations will focus on flood damage reduction measures and opportunities for environmental restoration. Ongoing studies of the Yazoo Backwater and Headwater Tributaries are scheduled to be completed in 2001 and 2002, respectively.

Studies

Yazoo Basin ***(Vicksburg District)***

The Lake Operations and Outlet Channels study reviewed the outlet channel capacities of the four Mississippi lakes. The study was completed in 1987 with the recommendation that the east bank Panola-Quitman flooding levee be modified to provide for 10-year frequency protection. The completed Greenville, Mississippi, Area report identifies the flooding problems in the Greenville area and offers alternatives to be accomplished by local interests to alleviate these problems. The report was published in January 1981. The Moon Lake, Mississippi, Area report evaluates alternative solutions for providing flood protection in that area and for improving the water quality, fisheries, and recreational resources. The report was published in September 1983. None of the alternatives were economically justified.

Other completed studies include a study of the Yazoo City, Mississippi, Area which reevaluated the existing Yazoo City Local Protection Works and flooding problems on Willis Creek and City Ditch. A study of McKinney Bayou, Mississippi, analyzed the possibility of providing additional pumping capacity at the existing pumping station, of diverting flood waters into White Oak Bayou, and of constructing a new diversion channel and a new pumping station at the upper sump. A study of interior flooding problems within the levee at Greenwood, a study of rural and agricultural flooding in the Big Sand Teoc Creeks area, and a study of major reservoirs which would provide additional flood protection from hill runoff into the Delta were conducted. None of the studies indicated economic justification.

In addition to the specific project studies noted above, several basin-wide studies are being made. An environmental inventory and assessment study, a recreational needs analysis, and an institutional analysis were completed in 1980. An economic base study was completed in 1977. A basin-wide study to evaluate ground and surface water supplies and develop multi-purpose flood control and water supply measures culminated

in completion of a reconnaissance report in 1991. Subsequent feasibility studies for Mississippi Delta, Mississippi, limited solely to flood control purposes began in 1993. These investigations focus on the Big Sunflower River Basin, including the major tributaries of Quiver River and Bogue Phalia and several smaller tributaries. These studies are scheduled for completion in 1997.

Flood Plain Management

Big Sunflower River and Tributaries at Clarksdale *(Vicksburg District)*

Flood hazard report on floodprone areas in 15-mile segment of Big Sunflower River and tributaries, vicinity of Clarksdale, Mississippi. Report published in 1970.

Coldwater River, Opossum Bayou, and Tributaries at Marks-Lambert *(Vicksburg District)*

Flood hazard report on 100-square-mile flood-prone area in vicinity of Marks and Lambert, Mississippi. Study covers a 26-mile segment of the Coldwater River, Opossum Bayou, and their tributaries. Report published in 1971.

South Tippah Creek and Tributaries *(Vicksburg District)*

Report identifies flood-prone areas as being primarily agricultural with some residential and commercial properties affected in the vicinity of Ripley, Mississippi, on South Tippah Creek and tributaries. Report published in 1976.

Yazoo City *(Vicksburg District)*

Flood hazard report identifies flood situation associated with interior ponding within the levee area at Yazoo City, Mississippi. Report published in 1972.

Yazoo River, Big Sunflower River, and Tributaries in Humphreys County *(Vicksburg District)*

Flood hazard report covers flood situation on 67 miles of the major streams affecting Humphreys County, Mississippi. Streams include Yazoo River, Big Sunflower River, and their tributaries. Report published in 1971.